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ABSTRACT

This study was concerned with implementing guidelines from studies of the differences between boys and girls in school-related behaviors to test the contribution made to educational goals by considering gender of the learner. The basic strategy was to consider tested sex differences in behavior and to use these as a basis for developing classroom activities and materials most appropriate for boys. Section 1 of the report contains a review of studies of school-related behaviors and abilities of boys and a discussion of school innovations which can help to accommodate sex differences. Section 2 describes the experimental classroom program tested in this study. Included in this description are: (1) the goals, physical organization, and equipment of the classroom, (2) organization of the classroom day, (3) examples of curricular modifications, (4) a sample curriculum unit, (5) classroom materials, (6) classroom stations, and (7) pupils' comments. Section 3 presents the design, methods, results, and conclusions of the program evaluation. A list of suppliers of the classroom materials used in the study is included. (JMB)

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BOYS IN PRIMARY SCHOOL

REPORT OF RESEARCH CONDUCTED UNDER E.R.I.B.C. GRANT NO. 47
"THE DEVELOPMENT AND EVALUATION OF A MORE APPROPRIATE PROGRAM FOR BOYS IN THE PRIMARY GRADES"

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BOYS IN PRIMARY SCHOOL

A child starts school with hopes that the classroom will be a safe and friendly place where success in an expanding world of knowledge and people will be found. The teacher devotes energies to learning about the child, providing learning experiences that will be appropriate and monitoring the development that occurs in this and other children during the school year. Providing these appropriate experiences is a complicated task.

Problem

The present study was concerned with implementing guidelines from studies of the differences between boys and girls in school-related behaviors to test the contribution made to educational goals by considering gender of the learner. The basic strategy was to consider those sex differences in behavior which have been tested and supported in order to develop classroom activities and materials that are more appropriate for learners.

Recently, considerable attention has been directed to abuses generated by ill-founded interpretations of sex differences in educational settings and elsewhere. Unfortunately, the heat of this spotlight has not necessarily ensured rigorous, coherent enquiry. The very process of asking questions about differences between the sexes, let alone deliberately developing programs to accommodate to them, has become a risky activity. While the contemporary social context of any research effort cannot be ignored, the particular attention directed both to sex differences and to the schooling process suggests that the research problems approached by the present study deserve particular care to reduce misinterpretation. In reporting the study, we have attempted to recognize explicitly the limitation of the

the design and measures employed and to draw conclusions soundly and conservatively. It is hoped that critical consideration will be given the guidelines and results reported below.

An initial assumption, which was eventually tested to some degree, was that consideration of sex differences among learners will yield two results:

a) increased effectiveness in the attainment of learning goals (e.g., through providing stories to boys that correspond more closely to their interests than do many stories in conventional materials);

b) satisfactory development of an esteemed sex role.

A suitable overview to our work was provided by a comment made by Minuchin (1966) at the conclusion of her study of sex differences in school children:

> . . . the educational challenge may be a complex and subtle one: to accept patterns of difference and offer channels for their expression; to help shape important identifications without stereotyping; and to provide broad horizons, a supportive atmosphere, and a range of learning possibilities from which the child - boy or girl - can select and develop a personal life style to be integrated with a committed sex identity and a resolved social sex role. (Minuchin, 1966, 48)

This position acknowledges the importance of a child's sex identity yet stresses the dangers of restricted and stereotypic definitions.

More recently, the problem of accommodating sex differences in school settings without the unfairness of many present practices was approached by the editors of a paberback, And Jill Came Tumbling After, which is concerned with sexism in education. The authors acknowledged that unfair treatment to individuals is not always directed toward females; in the elementary grades it is more likely to be directed toward males. Several of the readings in the book document the difficulties experienced by young boys in school, leading the editors to coin the phrase "poor-boy" to describe these views

of young students. Their comments about the implications for changes in school practice are important to consider:

> . . . the poor-boy tradition is rooted in a firm commitment to traditional sex roles; it looks to segregated classrooms and boy-oriented curricula to protect the interests of boys. Equally firm is the commitment of feminists to do away with rigid sex distinctions and to make the school experience livelier and more rewarding for all children. (Stacey, Béreaud, & Daniels, 1974, 22)

The latter part of their statement represents the major lesson and guidelines developed in the present study. Our orientation is different though, in that we are concerned about nonrigid and nonarbitrary sex distinctions, where they exist, that can be considered by a teacher along with other information about a child to develop the "livlier and more rewarding" experiences.

Much of the study was concerned with locating and removing unwarranted distinctions made on the basis of sex by testing the support behind common guidelines used by teachers and parents. The recent work by Maccoby and Jacklin (1974) has been particularly helpful. Knowledge about sex differences in development and behavior has expanded rapidly, as has the awareness of the vast amount which is not known. Maccoby acknowledges the rapid changes in her reference to her own earlier work:

> These arguments have not stood up well under the impact of new experience. As will be seen later, there is now good reason to doubt that girls are more "dependent," in almost any sense of the word, than boys. . . . there is no evidence that the sexes differ on tasks calling for serial internal processing; furthermore, girls are not more oriented toward interpersonal cues. (Maccoby & Jacklin, 1974, 132)

Some differences, such as verbal and physical aggressiveness, do find empirical support but the complexity of this area of study needs to be considered before generalized statements of differences, or lack of differences, between boys and girls are made.

Studies of School-Related Behaviors and Abilities of Boys

The particular problems encountered by boys in the elementary grades are well-documented. Referrals to remedial reading teachers, speech therapists, and school "disciplinarians," and psychological services typically show a ratio of at least 2-to-1 of boys-to-girls. Attendance in programs deemed indicators of good citizenship and school involvement, such as the choir, the safety patrol, and the library assistants group, typically shows the reverse ratio of boys and girls. Less-readily-available information, such as the range of teachers' grades and the names of children retained in grades or assigned to a "slower" program, usually support the general picture of boys experiencing more problems than girls. Strong statements about the lack of accommodation in schools to the particular needs of boys were made in the mid-1960's. Grambs and Waetjen (1966) wrote:

> The most unequal thing that happens in our schools is that unequals are treated as equals. . . . Human beings are taught and reared differently according to their sex. Yet, our schools seem to pretend that these teachings have no influence on the thinking, adjustment, and learning of pupils. In short, our schools are sex-neutral institutions operating on the assumption that all persons are alike . . . . We wish to make crystal clear our position that it makes a significant difference whether the person we are teaching is a boy or a girl pupil and that instructional provisions should be made accordingly (59-60).

The implicit assumption of these authors, of course, is that when differences among children have developed prior to school-starting age, the school must maintain differential treatment. Perhaps, in light of recent criticism of such an assumption, the authors would soften their statement to refer to differences that are relatively immutable for reasons of constitutional basis, personal security, or social sanction.

Many studies of the particular needs of boys in school programs have been reported. These were considered in developing procedures for the

present study. A brief summary of these studies follows, together with comments based on recently-published material.

Physical Maturation and Skills

In many ways, greater proportions of boys than girls show biological weaknesses such as susceptibility to illness, greater mortality rates (e.g., 25 percent more deaths among male babies during the first year), and sex-linked disabilities such as color blindness and hemophilia. Rates of maturation vary substantially so that, on average, boys trail girls by 12 months at age six years and by 18 months at age nine years in passing the various physical "milestones" (Peltier, 1968).

Muscular differences are apparent at birth, with male neonates raising the head higher and for longer periods than females do (Nash, 1970, p. 189). On average, boys show greater strength and running speed but slower development of fine muscle coordination than girls.

Males have a higher metabolic rate, produce more physical energy, and require more food (Nash, 1970). Related to these differences is the usual finding that boys show greater physical activity, both in duration and space utilized. Maccoby and Jacklin (1974) caution against overgeneralizing about this difference since their review of studies suggests that "boys appear to be especially stimulated to bursts of high activity by the presence of other boys (p. 353)." Consideration of stimulus conditions is no doubt important but several recent studies suggest that in play with small groups of children in situations permitting a range of physical movement, boys use more space than do girls. Harper and Sanders (1975) observed boys and girls from three to five years of age in a nursery school that had indoor areas (craft corner, toy kitchen, library, music corner, block corner, and nature study area)

and outdoor space (storage shed, sand box, swings and jungle gym, climbing apparatus, pet shed, and lawn area). Observations were made during "free play time" for two groups of children and showed that boys used outdoor areas more than indoor in both fall and spring seasons. In time utilized, boys dominated girls in over 80 percent of the outdoor areas. The only indoor areas in which use by boys exceeded that by girls were the block corner and equipment shed. The one outdoor area used more by girls was a sheltered porch adjoining the main building (p. 8). In addition, boys spent more time "in transit," defined as entering three or more areas within a single 15-second period. In interpreting the results, the authors discount the suggestion that expectations of the teachers created conformity to sex-role stereotypes.

> During both years of this study, the nursery school staff was composed of women who held liberal, egalitarian views; there was no reason to suspect that the children were under pressure to conform to traditional expectations. Indeed on the basis of the 1971-72 findings, deliberate attempts were made by the staff to entice the girls outdoors during 1972-73. Thus if girls actually tend to rebel at adult demands for traditional sex-role behavior, sex differences should have been minimized in this permissive atmosphere. (Harper & Sanders, 1975, p. 11)

The authors concluded that their data support hypotheses attributing the greater activity level of males to endogenous factors such as muscle strength and vital capacity, higher basic metabolic rate, androgenic influences, and greater biological immaturity (p. 15).

Fagot (1975) studied children three to five years of age who participated in a summer play program. Of 24 play behaviors observed, boys showed a greater preference than girls for outside sand box play, play with transportation toys, and physical aggression such as hitting and punching. Girls showed a greater preference than boys for doll play, painting, play in kitchen area, and listening to music (p. 5).

The present study was based, in part, on the intention to develop classroom and curricular modifications which would increase the amount of active, physical involvement of students.

Intellectual Abilities and Interests

During the elementary-school years, the major difference in abilities of boys and girls lies in the area of verbal skills, where girls show greater fluency, verbal reasoning, and receptive language skills. The Maccoby and Jacklin (1974) review placed the start of divergence between the sexes in the late elementary grades, somewhat later than the age specified by most other researchers. These authors also concluded that male superiority develops in visual-spatial ability and mathematical understanding in adolescence, with little consistent differences being shown in childhood (Maccoby & Jacklin, 1974, 351-352).

Studies in school settings seem to produce more vivid pictures of achievement problems and slow intellectual development of boys. Mumford (1970) summarized the types of referrals of over 3000 children to a special education centre over a 10-year period. Boys exceeded girls in total number of referrals with particularly high ratios in language retardation, arithmetic retardation, and articulation-nonfluency speech problems. Templin (1957) found that by age five years girls exceeded boys in vocabulary score, length and complexity of verbalization, and most several articulation skills although she did add the caution that "girls tend to receive higher scores more frequently than the boys, but the differences are not consistent and are only infrequently statistically significant (p. 145)." Clark (1959) surveyed a large group of students in grades three, five, and eight, comparing achievement scores of boys and girls after statistically controlling for variations in age and "total mental ability." Even with these controls,

girls exceeded boys in the mechanics of English and spelling tests, a finding which lead the author to conclude, "It may be necessary to afford additional instructional time and materials exclusively to boys in the language area in order to bring their achievement to the level of girls in the same grade" (Clark, 1959, p. 76).

Bentzen (1963) in reporting on the higher incidence of boys having learning and behavior problems commented:

> Of the 147 first-grade children referred, the single greatest reason given for referral was social and emotional immaturity, with 120 or 81.6 per cent so classified . . . . Teacher comments indicated that these youngsters tired easily, lacked motivation and were unable to concentrate on learning tasks . . . [Other] youngsters exhibited social and emotional immaturity by a high rate of absenteeism, daily fatigue patterns, shyness, underweight, short attention span, reversals, infantile speech patterns and language development and inability to follow directions, to recognize words and letter sounds and to color within lines (95-96).

She reviewed studies relating the slower physiological development of boys to behavioral problems, hypothesizing that the predominance of males with problems "results from the failure to make realistic provisions for the male organizm's greater susceptibility to stress" (p. 98). Support to this speculation is provided by Anastasiow's (1965) study of kindergarten children. Boys who had firm sex-role preferences, as indicated by performance on a toy-preference test, scored significantly higher on the reading vocabulary and reading comprehension subtests of the California Achievement Test than did boys with unclear sex-role preferences. The author considered the data to support the hypothesis that boys who have developed to the point of adopting a sex-role are freer to direct energies toward academic achievement (p. 1065).

In a very readable summary of attempts to explain sex differences in school achievement, Dwyer (1973) considered the most valid explanation to be

conflict between pressures, particularly from mothers, for the boy to be active and autonomous versus the counterpressures to learn to read stories that are seen as having "overtones of frivolousness or femaleness" (p. 462). She found that children's sex-role standards about reading accounts for much of the variance in reading achievement scores in studies of boys and girls from grades two to twelve. Consideration of children's achievement in relationship to their views of their own sex-role development, and the appropriateness of school tasks in this regard, therefore seems warranted. Particularly important are the implications of a study by Kagan (1964) which reported that boys classify most school objects as being feminine.

A more general implication of Dwyer's conception concerns the correspondence between interests of children and content areas and activities provided by the school curriculum. Interests are perceived by sensitive teachers by such signs as response to particular parts of a story, materials brought to the classroom by the child, and topics of conversations among students. Spotty efforts have been made to develop, in a more comprehensive manner, techniques for measuring children's interests. Stanchfield (1962) interviewed boys in grades four, six, and eight for over an hour each and found that the most preferred reading interests concerned outdoor life, explorations and expeditions, and sports, Least interest was expressed toward music and art, poetry, and family life. The characteristics of reading material that most appealed to boys were unusual experiences, excitement, suspense, and action. These interest patterns were similar in each grade and among the various levels of reading achievement. She concluded that "some of the free-reading books and materials in the readers, especially at the primary level, not only do not motivate boys to read, but actually alienate boys' reading interests (p. 44)."

The question of how early these reading-interest patterns emerge has not been answered clearly. King (1967) concluded from her review of the literature that sex differences appear at about age nine. Furness (1963) came to a similar conclusion. Braun (1969), however, found that words with high interest-loading for girls (teaset, playhouse, ballerina, and fairy) and for boys (rocket, football, airplane, truck) led to differential success in learning and retention as early as the kindergarten level. In their study of children in kindergarten through grade three, Ford and Koplyay (1968) tested preferences for stories, pictures, and sentences and concluded that, "it seems clear that children's interests are related to age and sex to a much greater degree than to socioeconomic background (p. 236)." Byers (1964) categorized the items brought to school by grade one boys and girls for a "voluntary sharing period" (Show and Tell) to provide an index of interests. Boys showed particular interest in living things, toy cars and trucks, model airplanes, small working machines such as watches, and accidents or mishaps. In drawing implications from her study of first-graders she concluded:

> Differences in interests of boys and girls in the study suggest that current (school) content may often be geared to the major interests of girls than of boys. Boys' interests in outdoor activities such as fishing, vacations and excursions, swimming, horseback riding, and bicycle riding are seldom reflected in first grade readers; nor is there much content dealing with joint activities of father and son (Byers, 1964, p. 232).

This intriguing variation in the presence or absence of differences in interests of boys and girls prior to nine years of age seems related to the measurement approach. Those studies that limit the range of topics to those presented in conventional school materials find few differences between young boys and girls; those studies that depend more on children's free expression (such as voluntary sharing) find consistent differences. If curriculum reform is being considered, the latter approach would seem to

be the more appropriate source of information.

The possibility of differential styles of thinking and solving problems has been tested in a number of ways. The recent review by Maccoby and Jacklin (1974) does much to clear away some of the unfounded beliefs such as differences in learning simple, repetitive tasks, ability to approach tasks analytically, and probability learning. No consistent differences between boys and girls were found in the studies they reviewed. Other differences did, however, receive fairly consistent support. Boys, particularly in the preschool and early elementary grades, tend to be more impulsive in choosing a response rather than adequately considering other alternatives or consequences. Visual-spatial tasks tend to be accomplished more successfully by boys, although the difference is only slight in childhood. Boys tend to be more competitive, particularly when such an orientation is maladaptive. Girls tend to be more compliant to adults in following demands and directions (pp. 349-354).

Such a pattern of differences seems very compatible to the theoretical formulations of Lynn (1969) who considers that certain cognitive styles result from the way in which children come to identify with their parents (pp. 34-53). Essentially, his view is that girls typically have same-sex models close at hand as they go about the complex business of learning social skills. The girls' primary task then is that of "lesson learning" from the concrete demonstrations she sees daily. Boys have the more difficult task of identifying with a culturally-defined role, since male models are not typically available to them. The boy's approach is seen to be that of "problem solving":

> Thus very early in life the boy must either stumble on the right path or bear repeated punishment without warning when he accidentally enters into the wrong ones (Lynn, 1969, p. 36).

The more stereotypic behavior of boys as well as their greater anxiety about their sex-role identification are seen as results of this difference in the identification process.

Minuchin (1966) in a study of nine-year-olds found boys to be more assertive about themselves and more resistant and negative about school. Girls in her study were more oriented toward people, perceiving adults as being more nurturant than boys did. She felt there were clear implications for the school:

> Girls may find it easier and more rewarding to relate to the teacher, to accept his authority, to fulfill an expectation of cooperative behavior. Boys may find it difficult to learn from adults. Adult approval per se may be less important to him, and adult authority may be harder to accept . . . (Minuchin, 1966, p. 47).

A comparison of autoinstructional procedures and female teachers by McNeil (1964) found that kindergarten boys learned to read much better by non-teacher means. Fairly consistent support is found for the assumption that boys do not fare well in a conventional lesson-learning approach which depends on close relationships with the teacher.

The present study developed a program for grade one boys on the assumptions that verbal abilities, orientations to lesson-learning, flexibility of sex-role concept, and emotional maturity are not as well developed in boys as might be assumed by conventional programs. Boys were considered to benefit from a program providing for active, autonomous exploration which incorporated their greater preference for novelty, action, and excitement. In general, the implication from studies of boys' abilities was to cast school programs into a problem-solving rather than a lesson-learning format.

Classroom Interactions

Acknowledgement of the complexities of the learning process in school settings has led to an emerging concern with the personal interactions occurring among children and adults.

Children's perceptions of their teachers' feelings toward them were studied by Davidson and Lang (1960) who found strong associations between children's perceptions of teachers' feelings toward them and their own feelings about themselves ($r = .82$, $N = 203$); furthermore, perceived teachers' feelings were associated with scholastic achievement. In view of their conclusion that "it is essential that teachers communicate positive feelings to their children . . . (to) stimulate their growth academically as well as interpersonally (p. 112)," the finding that girls perceived their teachers' feelings toward them more favorably than did the boys is significant.

The reward system in classrooms has been attacked strongly by Sexton (1969) who has concluded that, in school settings, "muscle sinks and baby fat floats." In a rather loose research attempt, she found evidence that boys with distinguished academic averages are markedly unmasculine (pp. 44-47). She concluded that elementary schools, with its majority (85%) of women teachers, selectively reward students for neat handwriting, use of bland words, and passive learning (Chapter 2).

More carefully-conducted studies have found that the interactions between teacher and students are somewhat more complex than portrayed by Sexton. Meyer and Thompson (1956) studies the approval and disapproval evaluations of grade six boys and girls made by women teachers. In the three classrooms studied, boys received more disapproval contacts; in one classroom boys also received more approval contacts. Interestingly, though, children's perceptions,

as measured by nominations on a "Guess Who" inventory, were consistently that boys received more teacher disapproval and girls received more teacher approval. This pattern was reported by both boys and girls. The authors concluded that their data "lend indirect support to the notion that 'masculine' behavior is not tolerated by the typical teacher (Meyer & Thompson, 1956, p. 391);" little attention was made to the finding of more approval contact with boys.

Sears and Feldman (1966) compared teachers' responses to a questionnaire about differential treatment of boys and girls with teachers' actual behavior in classrooms. The majority of teachers reported that their aims in teaching, techniques of instruction, and effectiveness of control techniques were the same for boys and girls. Yet a review of studies of behavioral differences showed that teachers use a harsher voice tone when criticizing boys than when criticizing girls, comment disapprovingly at girls for lack of knowledge and at boys for violation of rules, and are more supportive of girls with low social power than of similar-status boys. When asked to express their liking for individual children, teachers liked friendliness and self-sufficiency in bright boys only; boys of average ability were more liked if they were fairly dependent, affiliative, and had good work habits. Emphasis was on friendly, agreeable qualities for both bright and average girls (p. 33). In general, the studies support the view that personal interactions in classroom settings are somewhat different for boys than they are for girls. Differences are particularly marked in the perceptions held by students about teachers' behavior with boys and girls.

Several hypotheses exist concerning the reasons for differential treatment of boys and girls. Sexton (1969) seems to have accepted the assumption that school expectations and standards often emphasize character-

istics that are the exact opposite of those possessed "naturally" by most boys, leading to a clash between boy and school:

> The feminized school simply bores many boys; but it pulls some in one of two opposite directions. If the boy absorbs school values, he may become feminized himself. If he resists, he is pushed toward school failure and rebellion (Sexton, 1969, p. 33).

A similar hypothesis was presented by Austin, Clark, and Fitchett (1971) who concluded that the abilities of girls "allow them to adapt more easily to structured environments, prescribed programs, and the other features of the formal school setting (p. 36)." The implication would seem to be that boys are treated differently in school because the behaviors rewarded in schools are less likely to be shown by boys. Several studies (Fagot, 1975) have found that preschool and primary-grade teachers reinforced both boys and girls for "feminine behaviors" 83 percent of the time. One study (reported by Fagot, 1975) found that male teachers at this grade level reinforce both sexes for feminine-preferred behavior 51 percent of the time and for "masculine" behaviors 49 percent of the time. The sex of the teachers, thus, seems to be related to the type of behaviors rewarded in classroom settings.

A somewhat different hypothesis about interactional differences focuses on the learning history of the child. Girls are seen as learning from a mother model so that the shift to a female teacher model at age five or six is relatively smooth. Boys are considered to have a more difficult task in shifting to the female teacher model from the father model (Austin, 1971). Use of words, types of interests, and system of values have come to be identified with men during the preschool years; the transition in kindergarten or grade one to trying to emulate women is seen to be necessary yet very difficult.

Still another approach considers subtle, but important, differences in reactions to failure shown by boys and girls. Caplan and Kinsbourne (1974) reported that girls in elementary grades tend to pursue social approval when they cannot win it by academic success; boys tend either to behave well "to avoid further disapproval" (p. 233) or to try to win esteem through sports or leadership. The alternative chosen by girls would appear to be both more constructive than trying to avoid disapproval and more immediately possible than sports or leadership success.

Conclusions from Previous Studies

Consideration of the numerous studies, including those reviewed here, produced the following conclusions which have influenced the development of modifications in school programs for boys, including those tested in the present study. These conclusions summarize the research literature considered above.

1. boys tend to experience greater difficulty than do girls in meeting school standards for academic achievement and behavior.
2. the slower physical maturation of boys is related to problems in fine muscle coordination and to greater chance of physical impairment.
3. greater activity level is shown by boys as evidenced in physiological differences (such as basic metabolic rate) and physical activity.
4. fewer differences exist in intellectual abilities and styles of thinking of boys and girls at early school-age than were assumed by writers as recently as five years ago.
5. boys tend to be less successful than girls in language-related course-work, including reading.
6. pressures which exist from many sources for boys to be independent and autonomous tend to conflict with expectations held by many teachers about desirable classroom behavior.

7. boys' interests tend to be in areas of active exploration, excitement, and the outdoors.
8. boys tend to take impulsive and competitive approaches to learning tasks even when it is maladaptive to do so.
9. problem-solving approaches, rather than passive lesson-learning, seem more appropriate to the preschool learning history of boys.
10. interactions with classroom teachers, particularly as perceived by students, tend to be different for boys and girls.

School Innovations to Accommodate Sex Differences

Modifications have been made in many ways to accommodate individual differences among children, including those that tend to accompany sex differences. By way of general evaluative overview, it is fair to say that assessment of the effectiveness of the various modifications is incomplete with the result that little agreement can be found among those providing school programs. For example, a resolution by the British Columbia Teachers' Federation directing its members to boycott any school practices which involve segregation of boys from girls followed closely the publication of Reading rights for boys (Austin, et al., 1971) which advocated deliberate selection of learning material and activities for boys. Similarly the debate about coeducational schools has extended for over a hundred years in North America (Maxwell, 1966).

For the purposes of discussion and consideration, school modifications to meet sex differences of students were considered to fall into one or more of the following categories:

1. provide more male personnel in elementary grades
2. segregate boys and girls
3. change the age-requirement for school entry

4. provide more appropriate curricular experiences within traditional classroom organization.

In essence, the present study implemented and studied three of these modifications. A brief survey of arguments and previous implementations follows to provide an evaluative and historical context.

Provide More Male Personnel

There has been a persisting tendency in the educational literature to link the greater prevalence of school problems of young boys to the general absence of men in the primary grades. A general rationale has been developed to the effect that a male teacher would introduce a style, a perspective on curriculum, and an evaluative system that would be different than that typically provided at present. Tolbert (1968) provides a useful, cautionary guideline against overemphasizing the teacher's gender:

> . . . the literature does not reveal any significant differences in teaching performance between male and female teachers that would justify the employment of the male teacher on his ability to perform and on the contributions he makes to the student and to the school rather than on simply the merit of his sex or the lack of men in elementary school (Tolbert, 1968, p. 41).

Nevertheless, speculations about the contributions of male teachers in elementary school abound. Tolbert (1968) found in an observational study that male teachers excelled over female only in directing and supporting play and physical activity but concluded that men are needed to provide a) models for sex role identification, and b) masculine influence to the curriculum.

Research which demonstrated that male teachers tolerate more noise than female teachers, allow more rough play, and are more aggressive and physical was reviewed by Gentile and McMillan (1976). These authors argued that the presence of male teachers would shift the perception, particularly by young

boys, that reading and learning are inappropriate activities for boys to involve themselves with and that "being tough, athletic, comical, and rebellious are viewed by boys as being more appropriate 'masculine goals'" (Gentile and McMillan, 1976, p. 773).

Grambs and Waetjen (1966) argued strongly that women are not aware that they use words differently, structure space differently, and perceive persons and reality differently from men. They consider the real villain, causing difficulties for young boys, is the expectations of conformity.

> The conformity demanded is that which is defined by women; inevitably boys will suffer to the extent that they do not or cannot learn the way teachers say they should. Similarly, girls who express interests which appear more like boys', or talents which are in 'boy' labelled activities are apt to be discouraged or ignored . . . (Grambs and Waetjen, 1966, p. 63).

Peltier (1968) concluded that, based on this view of the problem of young boys, there is an obvious need for more men teachers particularly in areas where divorce rate is high or many families are fatherless. He also recommended that additional male personnel be introduced to elementary schools as counselors, librarians, reading assistants, and volunteer tutors and coaches.

Personal documentation of the experience of male teachers working with kindergarten and grade one students was provided by Williams (1970) and Johnston (1970).

> To explore the male role, male activities are essential --- so in came an old bicycle, a huge box of tools, and off we went, "repairing" the bike . . . In addition to being a source of information about male kinds of skills and knowledge, I was very much a model for my boys. Early in the year (before I knew better), I constantly wore a tie. After the first week of school, I noticed that most of the boys were wearing ties (Johnston, 1970, p. 146).

Despite emphasizing their importance as male teachers in the classroom, both of these authors acknowledged that similar contributions could have been made by female teachers who are alert to differing needs or by fathers and other male volunteers.

Lahaderne (1976) has recently reported that the question of whether or not male teachers behave differently than female teachers is still only partially answered. In most of the comparisons between male and female teachers they considered, few consistent differences were found. Support for some differences, such as women using more community resources and men injecting more humor into interactions with pupils, was found but the author concluded that the number of differences is not significant nor consistently in favor of male teachers.

Segregated Classes

The European practice of providing separate instruction for boys and girls has only infrequently been followed by public schools in North America. Peltier (1968) described a program which was built on the rationale that separate classes for boys might minimize their difficulties. He reported that "studies have indicated that the boys taught in separate classes made better progress in language arts and mathematics than boys in control classes, but the differences were not statistically significant" (Peltier, 1968, p. 184).

Cameron (1969) studied interactions in sex-segregated classrooms at Morley-Brantford School in Burnaby. Boys' classes tended to have more student talk but a greater proportion of teacher talk was "direct" than in girls' classes. Average achievement scores of boys were lower than those of girls.

A study of all-male classes by McCracken (1973) found that boys in these classes classified reading-related items as masculine. The classi-

fication of school objects was consistently different than that of boys in a coeducational school, a difference that was found in grades 1, 2 and 3. There were no differences in reading items, such as newspapers and magazines, not primarily associated with the school.

The learning styles of boys in segregated classes show characteristics that are seen to be diluted or overlooked in coeducational classes. Kernchamp and Price (1972) compared boys and girls who were in sex-segregated classes with those in coeducational classes at the same school the following year. Boys in the segregated class were seen to be "freer to be themselves," demonstrating such characteristics as being investigative, having physical activity accompany mental activity, and wanting to be involved in decision making. In contrast, boys in coeducational classes seemed less willing to extend themselves, had problems in cooperating and doing seatwork, and were more often involved in playground conflicts.

Other studies have found either no support for segregating boys or girls or support for coeducational classes. Herman and Criscuolo (1968) studied grade one students in two classrooms of each type taught by female teachers. Teachers felt that students enjoyed being grouped by sex for reading and worked more cooperatively, apparently because boys felt less need to show off or to act defensively. Results of testing for letter knowledge, word recognition, and listening comprehension supported the conclusion that "heterogeneous grouping proved more effective for girls, but no difference between the grouping procedures was found for boys" (p. 98).

Delay Boys' Entry into School

A third alternative is to admit boys to formal school some six to twelve months later in age on the grounds that many of the difficulties

experienced by boys are based on attributes of physical development. Pauly (1959) concluded from a study of 30,000 children in grades two through eight that raising the legal entering age for boys, or lowering it for girls, would create "less frustration for boys, their parents, and their teachers; and there will be fewer drop-outs of boys in high school because of failing or unsatisfactory work" (p. 281).

Cautions about this type of change in attempting to meet the educational needs of both girls and boys were expressed by Clark (1959) who supported the conclusion that "chronological age alone as a criterion for entrance or promotion is probably the poorest method" (p. 73). Problems are created by the relatively weak relationship between chronological age and mental ability.

More Appropriate Curriculum

The alternative which eventually was most embodied in the present study concerns attempts to develop and provide a curriculum which more closely corresponds to the learning style and developmental characteristics of boys and of girls.

The following characteristics were considered to be particularly appropriate in designing curricular experiences for primary-school boys:

1. exploratory activities as well as lesson-learning. Austin, et al. (1971) suggest that in selecting materials, ". . . attention must be given to selections which will stimulate exploration by boys and develop an intense curiosity" (p. 8). They concluded that traditional textbooks are as many times restrictive as they are stimulating; non-textbook materials must therefore be gathered, tested, and used.

2. greater choice granted to students. Johnston (1970) described how he introduced activities such as baking, bicycle repairing, wearing costumes, and carpentry into the classroom. Shortly after leading a cooking activity he overheard a discussion between students concerning the propriety of boys cooking. He expressed his gratification at hearing one child respond, "But boys can cook if they want to . . . " (p. 146).

3. broaden reading material. Repeated criticisms have been made about the "frilly," unrealistic content and style of most reading material provided primary students. There is a need for impactful, active language including that provided in materials produced by boys and girls in the classroom.

4. reliance on multiple resources such as flannel boards, blackboards, machines, visitors, and trips.

5. format of instruction should include approaches in addition to reading and talking. Austin, et al. (1971) describe interest centers which "might include the types of materials boys would enjoy: i.e., rocks, simple machines, all manner of flora and fauna, pictures and picture books representative of boys' interests, and other similar material" (p. 9). Such centers would encourage students to explore, model clay, use felt pens, glue, listen, and construct.

6. attend to activity demands. Novel, surprising items and experiences should be provided to entice movement and exploration. Study trips to places of interest can be valuable if properly planned and staffed.

7. equipment should provide for large muscle activity as well as fine motor control. For example, word cards can be made with printing sets which have large printing blocks in addition to the usual method relying on paper, pencil, and coordination.

CLASSROOM PROGRAM

This section of the report presents the classroom teacher's view of the actual experiences which took place as well as the rationale he used in developing the modifications. The details listed below concern modifications which occurred over a span of three years. Comprehensive notes were not made, due to the pressures of maintaining an active classroom, with the result that a complete record is not available. This description is intended to offer some ways that were found for modifying the primary program.

The reader should keep in mind that these modifications represented only part of the daily program in the classroom. The music, daily stories, fun-time breaks, impromptu communications, and all the other fascinating things that go on in a primary classroom are not recorded here. It should be understood that these activities were always present.

The Classroom

Goals

The teaching situation was structured with the following conditions in mind:

1. The teaching emphasis should be more on stimulating a positive attitude to school than on academic achievement.

2. The activities should stress an active, physical involvement by the pupils.

3. The situation should use, or simulate very closely, events and materials found in the child's real world, especially in trying to solve problems.

4. As often as possible, surveys or other types of feedback, be used to relate child's interests with the concepts to be learned.

5. Each child be responsible for decisions, without consulting the teacher, such as talking to classmates, getting materials, going to the bathroom, and having free time.

6. The classroom itself must relate to, and blend with, the other classes in the school.

Physical Organization

The physical organization of the classroom was then designed to:

1. encourage children to move about by providing:

(a) materials left out in the open in different places of the room;

(b) animal interest areas (turtles, gerbils, fish, snakes, and other special visitors);

(c) stations throughout the room.

2. give a feeling of open spaces throughout the room by arranging desks in islands or clusters.

3. have display areas for children's materials brought into the classroom.

In general, there was no one part of the room where teaching took place. We worked everywhere in the room.

Equipment

The classroom was equipped with the regular school desks and tables. As well, we improvised boxes and used refrigeration cartons to make extra desks, puppet theatre, store, space module, and storage areas.

Materials were purchased to supplement the school materials at the stations and free time activities. These materials are described below.

Curriculum

The Primary Curriculum for British Columbia was used as the basis for our concepts to be covered and skills to be taught.

The Reading series was Gage's Language Experience, with supplemental phonics.

Curriculum modification then took place to fulfil the conditions stated for the teaching situation. In general, the modifications happened through either deliberate attempts to structure the learning experiences or through impromptu responses.

Structured modifications occurred by devising ways to get active involvement in order to learn a particular concept. For example, to teach the geometry concept of open/closed curves I devised a roadway with a drawbridge. Children brought and used own toy cars on this course.

Impromptu modifications resulted from taking an area of high interest that occurred suddenly, such as a neighborhood construction project or last night's TV show, and applying the concepts to be learned or skills practiced to the impromptu situation. For example, the Sidewalk Superintendent modification occurred when the class stopped regular activities to spend a whole day observing and recording the construction of a sidewalk near our school. This project served to provide learning in Language Arts through the development of an experience chart, learning to edit, and applying critical analysis. Arithmetic learnings occurred through the discussion of the necessity of accurate measurements in construction and estimating the approximate measurements for concrete ingredients. The area of Science was covered by examining the expansion and contraction of materials. Social Studies were approached through community workers and division of labor topics. Safety concepts were provided by considering

why sidewalks are necessary in our school area and reviewing how to use sidewalks. One student observed, further, that sidewalks were built with a slope to the roadway to allow water to run off.

The Classroom Day

All teachers have their personal styles and methods for operating in their classroom. These comments are included to indicate how we attempted to reach the goals outlined earlier.

Opening Routines

At the 9:00 a.m. buzzer the King or Queen of the day took charge of the classroom for the next 20 minutes. The teacher was in the background as an observer and rarely a participant. The King or Queen led the class in the Lord's Prayer, set the calendar, and supervised children in their reporting of Things of Interest.

The children who made reports were questioned by the rest of the class. The children's listening and questioning skills were developed by this routine. The value of effective oral communication was thereby demonstrated. The activity also served to develop a strong connection between the world (home, TV, events) and the classroom. The reports provided a means for the teacher to learn more about each child's world and to see areas that were weak in social or academic concepts. I often capitalized on this routine to base my teaching examples and presentations for the rest of the day.

The opening was an important part of the day to all of us and, in general, helped to set the tone of the day's activities.

More Structured Activities

We then moved into Language Arts which involved four Reading groups.

The groups were on a 20-25 minute cycle which required them to:

1. do desk seatwork
2. go to Teacher for Reading group
3. do more desk seatwork
4. do a job at a Station

(see the section below on Stations for details.)

Arithmetic followed this group work. Most of the afternoon activities in Language Arts, Music, Social Studies, Science and Art were done on a project basis. Interest in areas was determined by survey questions. Many of the projects provided for class members to work in teams of similar interests.

Free Time

When pupils finished an assigned activity at any time during the day they were allowed to go on Free Time. Thus, they would be free to read, visit the animals, build with the building sets, or use other available materials around the class in a responsible way.

Review of the Day

At the end of most school days we conducted a review of our activities and accomplishments of that day so we could see our progress and remember them when someone at home asked this question: "What did you do a school today?"

This review enabled me to determine what the children thought was interesting and valuable. Sometimes I received guidance for areas where the class would like to investigate further.

Examples of Modifications

Interest Survey

The following example shows how a series of classroom activities were developed from a survey of children's interests:

During September, the Grade One boys said their interests were:

WE WANT TO LEARN ABOUT:

motorcycles	cars
airplanes	cranes
trains	rockets
busses	boats
camels	rhinoceros

Basing my lessons on one of these interests, we proclaimed that Thursday, October 9th, was to be Car Day. The boys all brought in their favourite car. This is generally how the day went.

Opening discussion - of the many kinds of cars brought in. (Two boys brought in trucks. The class decided that they hadn't followed instructions so these boys had to put their trucks into their desks!)

Survey. "What do you want to know about cars?"

- all the kinds of cars
- about motors
- parts of cars
- how they go fast and slow
- how to drive a car
- how to skid a car
- when to stop
- how the lights (headlights) go on

Classification - pupils arranged their cars in groups that were nearly the same. A parking lot chart was made for "all the kinds of cars."

Pupils made four pictures of different kinds of cars and printed the names of the kinds of cars.

Sequence - discussed all the steps to take before starting a car. (They left out the first step - "fasten your seat belt.") We started our imaginary cars and went out to recess.

Arithmetic - oral discussion on "greater than, less than, and equal to," using cars:

"the convertibles are greater than the plain cars"

"the James Bond is less than the sports car"

"the ambulance is equal to the police car"

Saftey - discussed the colours red, yellow, and green. In order to drive our car out of the parking lot we have to know the traffic signals. Made a short chart. Each boy made his own traffic light.

Lunch

Safety - continued. The chart sentences were duplicated at noon and the boys had to cut and paste to match the chart. Finished their signals.

Art. "My Favourite Car" - Tempra paint on 18 x 24 manilla (red, yellow, blue). This was their first wet paint lesson with me and out of 32 boys we had one small spill and only one boy got his nose painted!

Review our day. Looked at our pictures, reread chart, checked list and class decided we will have to have another Car Day to complete list. Tomorrow (Friday) was to be Thanksgiving Day in class.

Pupils home. Teacher collapses as usual!

Experience Charts

The Experience Chart is a collective statement by class members which records activities considered to be particularly important or memorable.

The example below was created after discussion during "Things of Interest" indicated that there was a high level of interest in sidewalk construction going on outside the school. I conducted a survey of what the children were interested in knowing about this activity. We then went out for direct observation.

This chart was dictated and edited by the boys in only two 30-minute sessions. The words and on-the-spot editing came in torrents. I recorded the contributions on an overhead projector in blue ink and edited in green. The school secretary transferred the chart to ditto masters and we all had a copy to take home that afternoon.

The Sidewalk Superintendents

Our class went on a field trip to see the men making a sidewalk. Mr. Langhelt said that they had to work very fast so that the concrete wouldn't set while they were working.

The man said that you need a brush to roughen the sidewalk off so that you wouldn't slip. Mr. Langhelt took a picture of the man working.

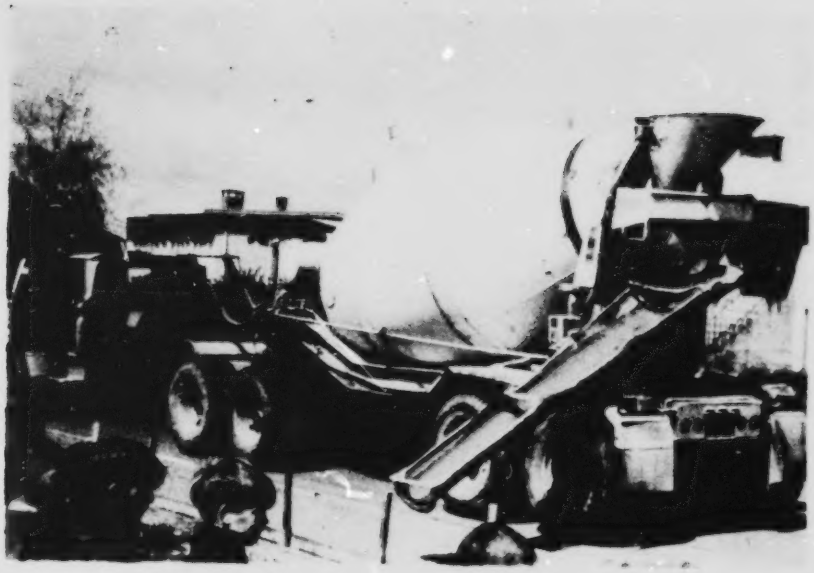
One side of the sidewalk was higher so that the rain would run off into the street.

We saw a machine called a power trowel. It makes the cement level with the curb and the 2 by 4 wood form. The men use oil on the form to make sure that the cement wouldn't stick to the board.

They used a metal trowel to smooth down the concrete.

Before lunch our class sat down and asked questions.

After lunch we went again to see the cement truck and



The Sidewalk Superintendents

power trowel in action. The cement mixer mixed together the gravel, cement and water. The truck was big and had thick wheels. The concrete mixer had a trough that concrete poured out on to the gravel.

We took a piece of expansion joint back to our classroom so that we could study it. After we studied it we made a chart. A sample of expansion joint was struck on to the bottom of our classroom chart.

It took twenty-four hours for the sidewalk to set. Now the people can walk on it. After a few days the men cut off the expansion joints and took off the 2 by 4 forms. The backhoe poured dirt beside the sidewalk. The ground is level with the sidewalk.

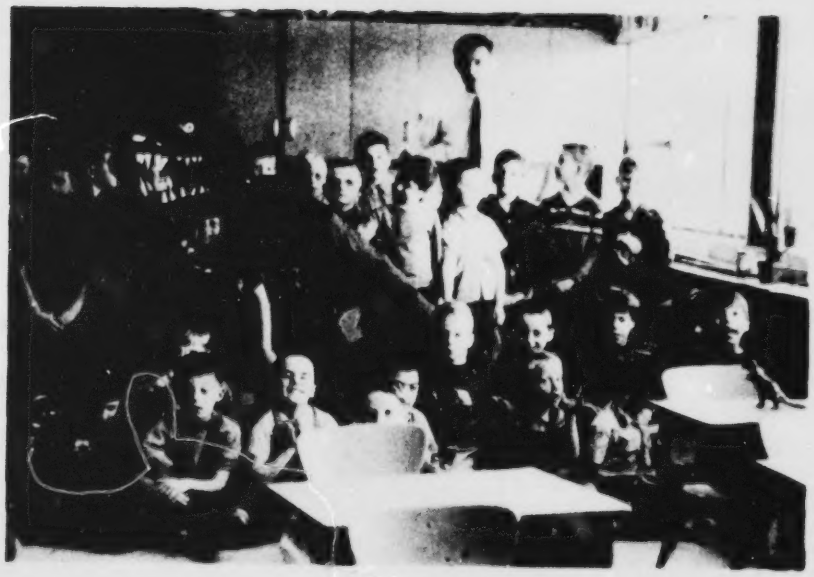
Sidewalk mission complete!

A Six-Week Unit

An interest survey showed what most primary teachers already know; there is an extremely high interest in dinosaurs. For a period of six weeks we spent about one hour each afternoon considering materials on dinosaurs. Activities included studying climate, modelling on plasticene, measurement, and biological classification. We also made a six-foot long model of a dinosaur.

A series of three charts, below, took nearly five weeks to complete. I insisted that students provide a four- or five-sentence outline before we made these charts. This requirement turned out to be wise because it forced students to keep to their own outlines.

Building the Dinosaur



Building the Dinosaur - Cont'd

It is safe to say that the boys argued over almost every word in these charts.

The Terrible Lizards

Long, long ago there were some reptiles called dinosaurs. They were the largest animals to rule the earth.

Dinosaurs lived in hot, swampy places. All baby dinosaurs hatched from eggs. They are cold-blooded animals.

Men have never seen dinosaurs in full action. Men have found terrible lizard remains. But these remains have turned into fossils.

Scientists have found all sorts of fossils like bones, eggs, foot-prints and mummies.

The Ancestors of Reptiles

When the dinosaurs were living there were first plant eaters and then meat eaters came along.

The climate was so hot that many plants grew. Plant eating dinosaurs had tremendous appetites.

One plant eater was the Thunder Lizard. He would have been as long as two classrooms.

Brontosaurus were the largest dinosaurs on the earth. He weighed so much that it sounded like thunder when he walked.

One of the meat eaters was the Tyrannosaurus Rex. And he was the king of the reptiles. The Tyrannosaurus Rex was the most fierce animal that walked on the earth. His jaws were four feet long and his body was as long as a frieght car. His sharp claws could tear the flesh off another dinosaur easily.

The Death of the Terrible Lizards

The three main reasons the dinosaurs died off were that the climate changed, the food supply died off, and the dinosaurs started eating each other!

That was the Age of the Dinosaurs.

Materials

Criteria

Criteria for selecting materials to be used in the classroom were established after considering certain conclusions about children in the early primary grades. There appears to be a deficiency, especially in boys, in skills involving eye-hand coordination, fine motor performance, language, and body image. We wanted to find materials which would both compensate for these deficiencies and use the known characteristics of boys.

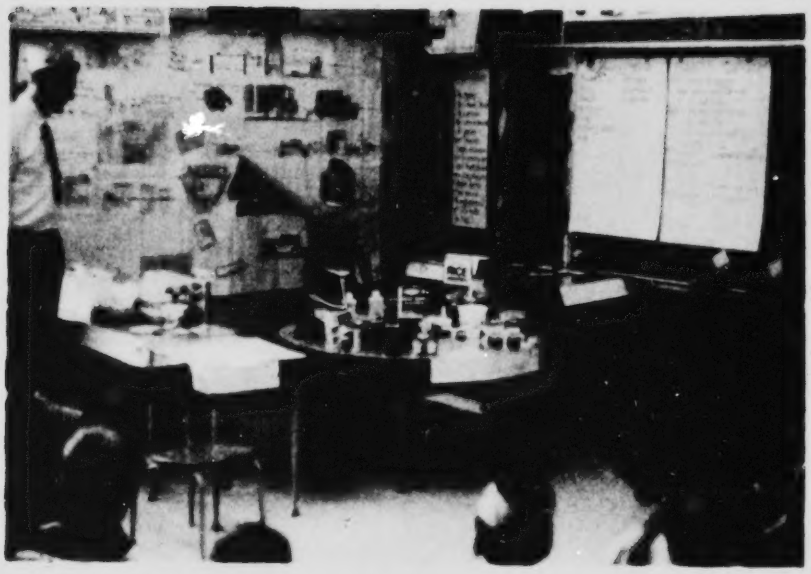
The following criteria were developed:

1. permit direct physical involvement
2. taken from or simulate real-life items
3. flexible enough to use in a variety of ways
4. feasible for purchase and use by a regular classroom teacher

The materials listed below are those which are not in general classroom use but which appeared to meet the criteria. Evaluations are based on teacher judgment after at least one years' trial.

Harbour Built of Plasticene, Paper, and Toy Boats

Studying Construction Equipment at the School



Tracing the Source of Grocery Store Items

Physical Involvement at Hallowe'en!

Table 1

Evaluation, Cost, and Supplier of

Materials Selected for Use in Boys' Program Study

Evaluation[a]	Item	Cost (1971)	Supplier[b]	Teacher's Remarks
**	Microscope (ESM10)	$ 11	S-W	10-power scope, fun to use
**	B&L Rite Lite	3	S-W	needed for microscope
***	Microslide viewers	13	S-W	very easy to use, highly
***	Microslide films	17	S-W	satisfying to pupils
**	Attribute blocks	16	Vilas	this has great potential
***	Canadian play money	10	Vilas	
***	Math balance	6	Vilas	
**	Classification game	9	Vilas	
X	Mancala	2	Vilas	
*	Dominoes "Nines"	2	Vilas	
*	Linguistic Block 1L	10	Gage	
**	Arithmecubes	5	Gage	
***	Teach Key Math	9	3M	should have 4 sets in class
**	"Good Work" seals	3	Bridan	
***	Number Line (40 pc.)	6	Bridan	
***	Alpha Print Book	4/ea	Kleeco	great fun to use
X	Chalk Talk Pencils	4/doz	Kleeco	use classroom chalk
X	Sponge Eraser	12¢/ea	Kleeco	use classroom eraser
*	Ryton School Kit	15	Gladwin	
***	Lego Set (34-450)	10	ESC	very well used

See footnotes at end of table, p. 38

Table 1 - Continued

Evaluation[a]	Item	Cost (1971)	Supplier[b]	Teacher's Remarks
***	Set C Plastic Mecano	$ 12	ESC	very well used
***	66-80W Connector	13	ESC	very well used
**	84-100 ABC Lotto	2	ESC	
**	1X-1 5A Simplex Clock	2	ESC	
**	1 SR-18 Jr. Scrabble	4	ESC	
***	P 106 Farm Stencils	4	DLM	very well used
*	T-139-C Auditory	5	DLM	
***	P-127 Cards 1	1	DLM	
***	P-162 Cards 111	3	DLM	
***	M-194 Sensanumber Track	10	DLM	high interest level
***	NS 053 Mirror Set	12	CP	creative fun
***	NJ 319 Flexible Mirror	4	CP	great fun
***	Stethescope (2)	3	CP	inspires childrens' curiosity
***	Wooden laundry set	4	CP	
***	Metal cash register	4	CP	
**	Ponder Posters	4	CP	
**	Color Paddles	2	CP	
***	Big I, little i	6	CP	always being used
X	Giant incubator	18	CP	not useful
***	Giant magnifier	10	CP	
***	Number Line Lab	21	CP	
***	Children's Hospital (Sr)	3	CP	excellent puzzles

See footnotes at end of table, p. 38

Table 1 - Continued

Evaluation[a]	Item	Cost (1971)	Supplier[b]	Teacher's Remarks
***	Underneath City Streets	$ 3	CP	excellent puzzles

[a]Evaluation followed the following code:

X unsuitable in class setting
* limited usefulness in classroom
** recommended for general use
*** excellent, met criteria fully

[b]Suppliers are listed in Appendix A by the initials used in this table.

Classroom Stations

Stations were established in the classroom to provide areas where pupils could interact with each other in small groups. Each station was directed toward a specific goal which could be reached by the students with little supervision or clues from the teacher.

Goals

The stations were developed to move students toward the following goals:

1. Independence - to work on a project in a constructive manner without close supervision from a teacher.
2. Cooperation - to work with other pupils in a small group situation.
3. Pacing - to complete a task within a specific period of time.
4. Mechanical skills - to operate equipment, tape recorders, show film strips and technicolor film loops.

Method

Usually four areas were established around the classroom, with activities specified by the teacher on cards left at each station. Pupils reported to the station at designated times during the school day and worked on the job within the time period. They changed stations as shown on the pupils' chart of the cycle. Stations included activities such as printing, listening, arithmetic, science, creative writing, art, games, and reading.

Typical Station Cycle

This cycle lasted approximately one month.

Phase 1. printing - chalk book

story - spacemen

science - mirror cards #3

arithmetic - facts of 12

art - doctor and fireman wet paint

Phase 2. listening - "Too Much Noise"

science - mirror cards #4, 5, and 6

story - puppet

printing - word cards

special - puppet theatre

Phase 3. science - mirror cards #8, 9, 10, and 11

arithmetic - facts of 13

art - string and wet paint

games - Junior Scrabble

science - review

Phase 4. listening - Lesson #9

story - "Boy and Fishbowl"

printing - want ads.

science - magnets

Method of Assignment

Two methods, structured and unstructured, were used to direct students to the stations in a clear, efficient way.

The structured approach involved placing a chart on the wall which described the schedule to be followed each day. Membership in the groups was predetermined. A small number of stations were provided initially; once students were able to follow this schedule a new station was added each day.

The unstructured approach provided for each child to choose a station each day. Five stations were set up at the beginning of each phase. Usually stations were changed on a weekly basis.

The structured approach was preferred because it gave a better chance to change stations to meet emerging needs. Furthermore, it avoided the pressure on the teacher to set up five stations at one time.

Evaluation

Problems in using stations rested mainly on the difficulty of finding non-reading approaches for grade one students. It was also difficult at times to provide tasks of appropriate length to fill the time period. One also has to ensure that tasks are relevant, not just busy work.

The most desirable stations, judged by student response and learning, were those which involved attractive equipment and materials such as earphones, filmstrip projectors, chalk or felt paint, wet paint, and manipulative devices. Generally, the more physically involved children became with the work at a particular station, the more positive were their attitudes about it.

Pupil's Comments

On the last day of school, the children were asked to describe the activities they "really liked," those they "did not like," and suggestions of "things I wished we had done."

By far the most popular activities were King of the Day, hot-wheel car races, and making the dinosaur. Other activities which were liked were watching the fish and tadpoles, puzzles, and printing.

About one-third of the students reported activities they had not liked. Most references were to "hard work" such as particular arithmetic problems,

and spelling. Some students mentioned specific activities such as "doing the pictures of mothers."

Students mentioned that they would have liked to have gone on field trips, such as to Sealand, worked for longer periods on cars, and made more papier mache animals.

RESEARCH PROGRAM

The research program was developed to fit the characteristics of the ongoing school programs into which the modified primary program was introduced. In matters where academic and practical guidelines suggested a course of action at variance with that suggested by research guidelines, the former were given precedence. For example, an all-boy class was formed in phase one of the study because the pattern of enrolment that year was characterized by an unusually large proportion of boys and sufficient grade one students to warrant four classrooms. The next year both the proportion of boys and the total number of grade ones were reduced so that a replication of the phase of the study was not practical. Phase two was embarked upon to meet the general goals of the study within the changed circumstances by placing a male teacher with a grade one class of boys and girls to study the effects of modifying the program without segregating students on the basis of sex.

In general, the research efforts were directed at testing the response of boys and girls to modifications in the school program which attempted to fit the curriculum to student characteristics, particularly those characteristics associated with sex-role. As described in the section of this report concerned with the classroom program, the modifications were characterized by active involvement, real-life activities, and response to students' expressions of interest. For research purposes, it was predicted that such changes would lead to more positive attitudes towards school, to greater development in areas such as oral language and problem-solving skills, and to increased perception of school as an appropriate place for a child to be. Particular attention was paid to sex-role variables since the presence of

a male teacher and many of the program modifications were based on the rationale that many current classroom practices ignore characteristics of young boys. Most of the dependent variables, described below in the section on Measures, were concerned with interests, sex-role typing, creativity, and oral language. Some reading scores were gathered and an achievement battery was used on one occasion but, in retrospect, academic achievement probably did not receive sufficient attention when variables were being selected.

The rationale for the study was based on the observations that important characteristics of children, associated with both their gender and their sex-role, were being ignored by current school practice. Particularly influential were the conclusions drawn by such writers as Sexton (1970) that the "feminized school simply bores many boys" (p. 26) and that if "a boy absorbs school values he may become feminized himself" (p. 26). The present study was designed both to modify primary programs in light of what is known about young boys and to put to empirical test some of the speculations, such as Sexton's, about relationships between sex-role and other characteristics of boys and girls in school settings.

General Design

The study was designed to compare the scores of boys and girls in the two types of modified grade one programs with those of students in regular programs. Relationships among variables, such as sex-typing and language development, were also examined in both the modified and regular programs. In addition, comparisons between scores of boys and girls in the regular programs were conducted to provide a Canadian replication of sex-difference studies conducted elsewhere.

The final study consisted of two phases. Phase one provided an all-boys class taught by a male teacher, an all-girls class taught by a female teacher, and comparison classes of boys and girls taught by female teachers. Phase two provided a modified program for boys and girls taught by a male teacher and comparison classes of boys and girls taught by female teachers.

Completely random assignment of children to each of the classrooms was not possible. In phase one randomization was approximated because there were four classes of grade ones at Richmond School permitting assignment of boys to either an all-boys or a mixed classroom. Some assignments, however, were made after discussion among teachers, principal, and parents indicated that a particular child might fare better with a particular teacher. To permit more thorough comparisons, two classrooms of grade one students in regular programs at a neighboring school were also studied. As shown in Table 2, experimental subjects in phase one could thus be compared with grade one students in a regular program in Richmond School and those in a neighboring school. In addition, some data were available for grade one students at Richmond School one year before phase one began. Comparisons with these data permitted a time-lag design; comparisons of data collected in Year 2 followed the "nonequivalent control group" design described by Campbell and Stanley (1963). Data from subjects in phase two of the study, male teacher with mixed class, were compared with data from Year 1 and Year 4 (see Table 2) following the time-lag design.

Method

Measures

The measuring instruments were selected through pilot study work to provide indices of interests, perception of school, sex-role development,

Table 2

Number of Boys and Girls in

Experimental and Comparison Classes

School	Group	Year of Study							
		1		2[a]		3[b]		4	
		boys	girls	boys	girls	boys	girls	boys	girls
Richmond	experimental	-	-	31	32	12	10	-	-
	comparison	12	17	31	29	-	-	17	15
Margaret Jenkins		-	-	28	25	-	-	-	-

[a]Year 2 constituted Phase One of the study (all-boys, all-girls classes)

[b]Year 3 constituted Phase Two (male teacher)

academic achievement, intellectual development, and sociometric standing. Most of the instruments were administered individually to children by research assistants experienced both in establishing rapport with children and in following standardized instructions. Because of the nature of many of the instruments, sex of examiner was considered an important consideration. Male and female examiners were employed, with equal numbers of boys and girls assigned in a random manner to each examiner. Individual testing took place in rooms separate from the classroom. Group testing took place in the classroom; a research assistant administered the task with the classroom teacher assisting.

The following instruments were used in the study:

1. It Scale for Children (ITSC) -- a measure of sex-role orientation developed by Brown (1956). The child is asked to make choices for "It" for either male- or female-oriented toys, games, household objects, and child figures. Pilot work indicated that the stick figure for "It" used by Brown tended to be seen as a stick man, thereby leading both girls and boys to make masculine choices. Similar problems have been reported by other researchers, such as Reed and Asbjornsen (1968). To reduce the problem, reference was made to "a card with a picture of a child in this envelope" and children were shown only the back of a card being placed in a blank envelope. Scoring procedure followed that devised by Brown, with a score of 84 indicating consistently masculine choices and a score of 0 consistently feminine choices. As second score was derived from the name each child gave "It" at the end of the procedure. A male name was given a score of 1; a female name a score of 2.

2. School Objects Classification (Kagan) -- an individually-conducted learning activity in which school objects are classified as being masculine

or feminine. The procedure was developed by Kagan (1964) to provide an intensive but somewhat disguised method of determining whether children considered various school objects as being masculine or feminine. The child is taught three nonsense syllables to represent masculine, feminine, and "other" categories then is presented with twenty new pictures and asked to apply the most appropriate nonsense syllable to each. Nine of these pictures show school objects, such as an arithmetic page or a book. Three scores were derived: number of trials to reach criterion, number of school objects classified as feminine, and number of school objects classified as masculine. Trials to criterion was considered to indicate the saliency of masculine-feminine classification cues.

3. Games Preference -- each child was asked to consider a listing of twenty games to indicate whether he or she had played each game and, if played, whether the game was liked. Games were considered to be masculine or feminine on the basis of children's conceptions of sex-role appropriateness of these activities reported by Rosenberg and Sutton-Smith, (1960). The measure yielded scores for number of masculine and feminine activities each child played and the proportions that were enjoyed.

4. Reading Interest -- a list of 40 book titles, representing eight areas of interest, were presented to each child for his or her opinion on "would like" or "would not like" to read a book of that title. The basic list of titles, such as "A Magic Ring" and "An Animal Who Could Talk," was derived from Rogers (1963). Modifications were made to extend the list to include more sports and adventure titles and to make references to current Canadian situations. Titles were categorized as masculine, feminine, and both, following the guidelines described by Stanchfield (1970). Scores were

provided for number of masculine titles liked, number of feminine titles liked, and total number of titles liked.

5. Language Complexity -- an index of the syntactical complexity of oral language was provided by considering the average length of communication unit following a procedure reported by Loban (1963). Each child was asked to tell a story about some pictures. Oral responses were taperecorded and analyzed into "communication units." The average number of words in these units was used as an index of language complexity.

6. Human Figure Drawings (HFD) -- drawings of a person were assessed by the Harris (1963) procedure to provide an indication of general intellectual development. Children were asked in their classroom groupings to "draw a picture of a whole person." The examiner collected drawings as they were completed and indicated on each whether the child considered it to be of a male or female. The child was then asked to draw a person of the opposite sex. Scores derived from this measure were standard scores (Harris, 1963), number of masculine and feminine characteristics in each drawing (Koppitz, 1968), first-drawn figure relative to child's own gender (Skilbeck, Bates, and Bentler, 1975), and the ratios (drawing of own sex: drawing of other) of standard scores and height of figure.

7. Stanford Achievement -- school achievement was measured by the six subtests of the Primary 1 level of the Stanford Achievement battery (Form X).

8. Sociometric Standing -- was assessed by asking each member of the class to nominate three persons as companions on the bus (restricted choice) and to report their invitation list for a picnic (unrestricted choice). Scores for each child were the number of times each was chosen by classmates.

9. Neale Analysis of Reading Ability -- an individually-administered reading scale which requires the child to read six passages of graded

difficulty. Comprehension questions follow the reading of each passage. Norms are provided in the Manual (Neale, 1958). Scores derived were level of difficulty mastered and number of comprehension questions correctly answered.

Sample

Children selected for the program attended Richmond School in Victoria. Some students from a neighboring school, Margaret Jenkins Elementary, were included for comparative purposes in Year 2 of the study (Table 2). Both schools are located in middle-class areas, with primarily single-family residences. Richmond serves an area that includes an apartment complex which has a disproportionately high number of single-parent families.

Each of the students was entering the grade one program for the first time. All but three or four students in each class had at least one year of preschool experience, in most cases the kindergarten program held in the school. The preschool experiences were typically in programs designed to develop social and emotional maturity and were conducted by female teachers.

Richmond School has a relatively new building, with a library and a full gymnasium. At the time of the study there were 18 classrooms in use. Of particular interest to the present study, Richmond had a male librarian who had considerable contact with all of the students. There were no male teachers in the primary classes other than the experimental classroom.

Margaret Jenkins School has an older building, some fifty years old. At the time of the study, the school did not have a central library. All primary teachers and the librarian were female. The social-class background of students was similar on average to that of Richmond students but there was a greater range at Margaret Jenkins. Residences ranged from older two-bedroom homes to large homes on fairly large estates. Occupations of

parents varied from laundress, mechanic, stockbroker, engineer, and chemist.

Results

Considerable data about boys and girls in grade one programs were generated during the four years of this study. The present report concerns some of the basic comparisons and relationships that were studied; many other analyses are possible both on the data mentioned here and on some of the less basic data. For example, a presentation was made to the Northwestern Regional Conference of the International Reading Association on the topic of determining boys' interests in reading.

Phase One

The first phase provided for an all-boys class taught by a male teacher and an all-girls class taught by a female teacher. Both teachers, and those of the comparative classes, were experienced teachers under regular assignment in School District 61.

Teachers of the segregated classes had particular interests and skills in developing programs which met the needs of boys or girls. The classes spent most of their school time in the segregated format but there were class exchanges, assemblies, and visits to the school library that provided for interchange.

Data in this phase of the study were used to compare the performance of students in the segregated programs with that of students in regular programs and to examine relationships among variables. Comparisons are reported in Tables 3 to 8; intercorrelations among variables for boys and girls in the experimental control groups are presented in Tables 9 to 13. The associations between perceptions of school objects as masculine and achievement scores are reported in Table 7.

The ages of boys in the three groups reported in Table 3 are similar but boys in the segregated program scored much higher on the human figure drawing. This comparison suggested that segregated boys were somewhat higher in general ability. Boys in the segregated classes included more masculine characteristics in their human figure drawings than did controls at Richmond, but Margaret Jenkins controls included as many in their drawings (Table 3). The three groups showed similar sex-role preference (IT Scale) and choice of masculine titles in the reading interest survey.

Comparisons of achievement scores (Tables 4 and 5) support the conclusion that boys in the segregated programs performed significantly poorer than boys in regular programs, in direct contradiction to the hypotheses. On each of the Stanford subtests, except the Arithmetic subtest, segregated boys scored significantly lower (Table 4). On the Gates Reading measures and the Seeing Through Arithmetic classroom tests they scored lower than boys and girls in regular programs in year two at Richmond (Table 5).

Girls in the segregated classes showed a similar tendency to score lower on achievement measures than counterparts in the regular program but the differences did not reach statistical significance (Table 4).

Boys in the segregated program classified more school objects as masculine than did boys in the Margaret Jenkins program (Table 3). However, the Richmond control boys had similar scores suggesting that the general tone of the Richmond programs contributes to this perception. Classifications of individual school objects, reported in Table 6, suggested that major differences existed for the blackboard, library, books and both the pupil's and teacher's desks. Girls in the segregated and Margaret Jenkins programs showed similar patterns of classifications, except for the blackboard, library, and book (Table 6). Interestingly, more segregated girls tended to see these

Table 3

Sex-typing, Reading Interest, and Age for Boys

in Segregated and Control Groups

Boys' Group	n	stat[a]	age (months)	Kagan Classification			Human Figure Drawing			ITSC	Reading Interest		
				trials	school masc	objects fem	score	masc	fem	Score	masc	fem	total
Segregated	23	M	83.23	28.39	5.55	2.90	122.57	1.23	1.68	65.23	6.81	5.65	28.57
		S	4.71	15.94	2.45	2.23	18.95	1.84	1.80	28.21	3.24	2.89	6.06
MJ control	26	M	84.68	19.57	4.04	4.14	112.50	1.86	1.79	71.39	7.68	5.86	28.96
		S	3.63	10.49	2.47	2.51	15.02	2.03	2.20	24.86	2.47	2.79	6.11
Richmond Yr.4	16	M	84.35	31.47	5.24	2.65	104.87	0.41	1.82	75.00	7.24	6.88	28.38
		S	6.63	23.20	2.54	1.90	14.42	0.62	1.85	21.70	1.68	2.45	5.51

[a]statistic M = mean score

S = standard deviation

Table 4

Achievement Scores of Segregated and Control Boys and Girls

Group		n	stat.	Stanford Achievement Subtest					
				word reading	paragraph meaning	vocab.	spelling	word study	arithmetic
Boys	segregated	23	M	18.22	15.83	21.35	7.17	33.35	39.92
			S	6.09	7.23	4.92	5.01	8.00	14.70
	MJ control	26	M	23.21	21.61	24.43	13.07	42.96	40.46
			S	5.21	9.93	5.34	5.58	8.10	14.01
Girls	segregated	29	M	25.38	23.03	22.66	13.72	40.38	39.90
			S	5.83	10.14	6.65	5.41	8.04	11.11
	MJ control	25	M	26.52	27.76	25.52	15.80	44.32	40.72
			S	5.32	7.40	3.10	3.96	7.29	9.42
ANOVA F for sex				26.54***	17.97***	3.00	26.05***	8.83**	0.13
	school			10.91**	11.50***	10.79***	19.33***	20.06***	0.35
	sex x school			5.05*	0.37	0.52	4.75*	4.12*	0.06

*** $p < .001$

** $p < .01$

* $< .05$

Table 5

Sociometric and School Achievement Scores of Segregated Boys and Control Boys and Girls

Group		n	stat.[a]	sociometric-times chosen		Gates Reading		Arithmetic	
				bus (limited)	circus (unlimited)	vocab.	compre-hension	STAT problems	STAT facts
Boys	segregated	31	M	2.65	2.97	34.74	21.03	15.52	24.35
			S	2.81	3.43	8.96	7.76	3.38	7.11
	Richmond (yr. 2)	27	M	2.81	2.81	39.56	25.26	20.56	32.11
			S	3.06	3.73	7.28	6.21	3.30	4.50
Girls	Richmond (yr. 2)	26	M	3.27	3.46	42.04	27.96	19.46	29.31
			S	3.80	3.16	5.40	4.30	4.77	8.93
Analysis of variance:			F(2,81)	0.28	0.25	7.11***	8.66***	14.00***	9.04***

[a] M = mean score
S = standard deviation

*** $p < .001$
** $p < .01$
* $< .05$

Table 6

Classification of School Objects by Sex-Segregated and Integrated Classes of Grade One Boys and Girls

School Object	Classification	Number in Group				χ^2	p
		Boys		Girls			
		seg.	MJ	seg.	MJ		
pencil	masc.	24	25	16	16	10.66	.10
	fem.	6	3	10	8		
	other	1	0	3	1		
blackboard	masc.	14	5	10	6	11.93	.06
	fem.	16	21	16	19		
	other	1	2	3	0		
library	masc.	16	8	15	6	7.60	NS
	fem.	15	15	12	15		
	other	0	5	2	4		
book	masc.	20	12	16	8	6.73	NS
	fem.	10	12	13	16		
	other	1	4	0	1		
arithmetic	masc.	22	18	9	4	10.92	.09
	fem.	8	7	16	10		
	other	1	3	4	1		

(Continued)

Table 6 - Continued

School Object	Classification	Number in Group				χ^2	p
		Boys		Girls			
		seg.	MJ	seg.	MJ		
pupil's desk	masc.	21	13	11	10	6.66	NS
	fem.	7	11	15	13		
	other	3	4	3	2		
map	masc.	21	15	16	14	1.62	NS
	fem.	6	18	9	5		
	other	4	5	4	6		
teacher's desk	masc.	13	4	8	4	7.48	NS
	fem.	16	21	19	19		
	other	2	3	2	2		

items as masculine than did girls in the regular program, further supporting the speculation that the Richmond tone, in general, was seen as more masculine. Comparisons of percentages classifying objects as masculine, reported in Table 7, supported the general conclusion that all students at Richmond noted more school objects as being masculine than did students at Margaret Jenkins.

To test the hypothesis that perception of the sex-role appropriateness of school objects is related to academic achievement, the comparisons reported in Table 8 were carried out. Children in each of the segregated classes were grouped into low, medium, and high groups on the basis of their classifying school objects as masculine. For boys, there was a consistent association between lower masculine classification and better achievement, although the association approached statistical significance ($p = .076$) only for the Stanford vocabulary scores (Table 8). For girls, there were no consistent associations. The finding for the boys' group supports the contention espoused by Sexton that "muscle sinks" in classroom settings, but the evidence is weak.

Intercorrelations among variables were computed for each of the boys' and girls' groupings in the segregated and control classrooms. Of particular interest were the relationships between the sex-typing variables and achievement.

For boys in the segregated class (Table 9), there was a consistently negative, but nonsignificant, correlation between achievement scores and number of objects classified as masculine. In contrast, the relationship between achievement scores and number classified as feminine was consistently positive and reached statistical significance ($p < .10$) for Paragraph Meaning and Vocabulary. Sex-role preference, as measured by the IT Scale, was unrelated to achievement scores but positively related to masculine reading interest ($r = 0.54$, $p < .01$). An unexpected, but important, finding was

Table 7

Percentage of Students in Segregated and Integrated Classes

Classifying School Objects as Masculine

Group		n	School Object							
			pencil	board	library	book	arith.	desk	map	t. desk
Boys	segregated	31	77	45	52	65	71	68	68	42
	MJ control	28	89	18	28	43	64	46	54	14
	Richmond - Year 2	17	82	18	65	53	53	76	82	47
Girls	segregated	32	55	34	52	55	31	38	55	28
	MJ control	25	64	24	24	32	16	40	56	16
	Richmond - Year 2	15	67	27	60	53	60	40	60	13

Table 8

Association Between Achievement Scores and Classification of School Objects

Stanford Achievement		Masculine Classification of School Objects			ANOVA	
		Low (0-3)	Med. (4-6)	High (7+)	F	P
Segregated boys	(n =	8,	10,	11)		
Word reading	M	22.00	15.20	17.18	2.23	0.128
	S	6.05	8.63	5.62		
Paragraph meaning	M	18.75	16.70	11.82	1.94	0.164
	S	5.73	9.19	8.21		
Vocabulary	M	24.88	20.70	19.27	2.85	.076
	S	5.28	4.00	5.92		
Spelling	M	9.75	7.30	4.91	1.90	.170
	S	6.04	5.50	4.70		
Word study skills	M	37.00	32.70	31.45	0.78	.468
	S	9.04	10.88	9.26		
Arithmetic	M	45.75	39.50	34.82	1.25	.303
	S	15.54	14.20	15.00		
Segregated girls	(n =	16,	7,	6)		
Word reading	M	24.63	25.86	26.83	0.08	.956
	S	6.15	5.90	5.49		

(Continued)

Table 8 - Continued

Stanford Achievement		Masculine Classification of School Objects			ANOVA	
		Low (0-3)	Med. (4-6)	High (7+)	F	P
Segregated girls	(n =	16,	7,	6)		
Paragraph meaning	M	22.63	21.00	26.50	0.57	.751
	S	11.00	10.25	8.14		
Vocabulary	M	22.81	23.29	21.50	2.53	.282
	S	6.75	8.71	4.14		
Spelling	M	12.87	13.57	16.17	1.86	.394
	S	5.98	5.47	3.37		
Word study skills	M	39.25	40.29	43.50	0.07	.962
	S	8.41	7.63	8.02		
Arithmetic	M	39.31	40.43	40.83	0.05	.953
	S	12.25	10.66	10.11		

Table 9

Intercorrelations Among Sex-Typing and Achievement Variables

for Grade One Boys in All-Boy Program

(n = 23)

	Variable	Correlation with Variable[a] 18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
1	age	-32	-04	03	14	-03	-11	-31	-35	-10	12	04	-15	19	-29	-03	01	28
2	Kagan -number trials	-49*	-43*	-39†	-22	-46*	-36†	09	-07	-05	04	03	-18	-09	-05	-53*	46*	
3	-masc school objects	-20	-12	-29	-25	-35	-20	16	29	16	-28	54**	-27	-17	-04	-89**		
4	-fem school objects	31	24	33	40†	40†	18	-12	-21	05	11	-34	44*	27	11			
5	MFD standard score	44*	21	35	48*	39†	27	-33	-40†	-22	-05	09	36†	47*				
6	-masc characteristics	45*	32	33	73**	43*	30	-43*	-48*	-29	-15	17	10					
7	-fem characteristics	19	12	20	07	20	20	11	-03	20	00	-07						
8	IT Scale - total	-05	-12	-33	11	-16	-14	15	25	54**	-84**							
9	-name (1 = M, 2 = F)	01	23	32	-11	08	28	-27	-34	-62**								
10	Rdg. interest -masc.	-05	-25	-35	-19	-17	-23	69**	-63**									
11	-feminine	-30	-48*	-52*	-54**	-42*	-38†	91**										
12	-total	-32	-52*	-50*	-55**	-38†	-28											
13	Stanford-word naming	55**	71**	67**	26	71**												
14	-paragraph meaning	73**	83**	89**	45*													
15	-vocabulary	54**	45*	33														
16	-spelling	63**	81**															
17	-word study	71**																

[a]decimals removed for ease of reading (for 50, read r = 0.50)

** p < .01

* p < .05

† p < .10

the consistent pattern of negative correlations between reading interest and achievement scores. This correlation reached statistical significance for number of feminine reading interests and achievement scores.

Girls in the segregated class (Table 10) showed no relationship in achievement scores and number of school objects classified as masculine. Number of objects classified as feminine was significantly correlated with Vocabulary score, Human Figure Drawing score, and number of masculine reading interests. Sex-role preference (IT Scale) was negatively correlated with Vocabulary score ($r = -0.38$, $p < .05$). For girls, in contrast to boys, in the segregated program there was a slight, positive relationship between reading interest and achievement scores.

For boys in the Margaret Jenkins control group (Table 11), the relationships between achievement scores and masculine classification of objects was not consistent. Number of feminine characteristics in the figure drawings of this group was negatively correlated with Arithmetic score ($r = -0.43$, $p < .05$), and both feminine and total reading interest scores ($r = 0.40$; 0.40). Sex-role preference was negatively related to Arithmetic achievement ($r = -0.35$, $p < .05$) and Human Figure Drawing score. For this group total reading interest was more strongly correlated with feminine reading interests ($r = 0.81$, $p < .01$) than with masculine reading interests ($r = 0.43$, $p < .05$).

Girls in the Margaret Jenkins control class (Table 12) showed negative correlation between number of school objects perceived as feminine and both Word Reading ($r = -0.50$, $p < .01$) and Paragraph Meaning ($r = -0.47$, $p < .01$). There was a consistent tendency for sex-role preference for maleness to be associated with higher achievement scores in Spelling ($r = 0.43$, $p < .05$), Paragraph Meaning ($r = 0.56$, $p < .01$), and Word Reading ($r = 0.72$, $p < .01$).

Table 10

Intercorrelations Among Sex-Typing and Achievement Variables

for Grade One Girls in All-Girl Program

(n = 28)

	Variable	Correlation with Variable[a]																
		18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
1	age	18	02	24	-37†	24	12	29	-08	05	-19	02	07	-01	-22	-15	14	-06
2	Kagan - trials	-47*	-31	-39	-25	-55**	-45*	-48**	-07	-53**	-24	33†	05	13	-01	-24	-10	
3	- masc	00	15	26	-22	15	15	-03	14	-24	-22	12	21	-13	-48**	-72**		
4	- fem	15	27	18	42*	16	21	28	09	50**	28	-24	-20	13	57**			
5	HFD score	-02	19	15	29	19	27	27	00	37*	18	-22	10	27				
6	- masc	-05	29	12	20	15	14	-08	-19	09	-04	06	08					
7	- fem	-31	-05	17	-38*	17	22	-17	-10	-01	-14	15						
8	ITSC score	-04	-04	18	-09	08	08	-39*	-10	-25	-87**							
9	- name	12	04	-28	14	-13	-17	34*	09	32								
10	Rdg. interest -masc.	29	22	19	16	30	33†	73**	-02									
11	-feminine	-02	27	22	20	13	15	41*										
12	-total	28	20	24	05	33†	29											
13	Stanford - word	38*	74**	90**	20	91**												
14	- paragraph	53**	73**	90**	21													
15	- vocabulary	50**	51**	13														
16	- spelling	28	78**															
17	- word study	45*																

[a]decimals removed for ease of reading (for 50, read r = 0.50)

** p < .01

* p < .05

† p < .10

Table 11

Intercorrelations Among Sex-typing and Achievement Variables

for Grade One Boys in Margaret Jenkins Control Group

(n = 26)

	Variable	Correlation with Variable[a]																
		18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
1	age	03	00	-03	-10	-24	-29	08	15	-07	30	-24	10	17	-09	-10	-01	-30
2	Kagan - trials	02	02	14	00	11	00	-16	-10	-04	-27	12	27	-27	10	02	03	
3	- masc	-24	-05	-06	13	05	-06	05	08	-17	-19	18	-04	28	27	-68**		
4	- fem	10	-07	00	-33†	-18	-07	07	06	24	27	-26	14	-02	-13			
5	HFD score	42*	37†	37†	36†	30	20	-08	09	03	35†	-38†	-04	08				
6	- masc	-16	-12	-11	-11	-28	-25	13	05	10	06	04	03					
7	- fem	-43*	-13	-21	-24	-32	-16	-40*	-40*	-07	-30	22						
8	ITSC score	-35†	-11	-16	00	04	07	-15	-28	02	-96**							
9	-name	32	02	09	-06	-11	-15	20	31	03								
10	Rdg. interest -masc.	17	09	10	11	-08	-02	53**	43*									
11	-feminine	25	07	15	05	00	-20	81**										
12	-total	09	-19	-07	-12	-11	-19											
13	Stanford - word	52**	64**	72**	60**	86**												
14	- paragraph	61**	70**	78**	62**													
15	- vocabulary	69**	63**	56**														
16	- spelling	74**	84**															
17	- word study	68**																

[a]decimals removed for ease of reading (for 50, read r = 0.50)

** p < .01

* p < .05

† p < .10

Table 12

Intercorrelations Among Sex-Typing and Achievement Variables

for Grade One Girls in Margaret Jenkins Control Group

(n = 23)

	Variable	Correlation with Variable[a]																
		18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
1	age	-14	-24	-42*	-13	-35†	-32	03	25	-06	11	13	-36†	16	-43*	35†	-35†	11
2	Kagan - trials	-02	16	07	06	27	18	-15	07	-10	-03	30	-17	-19	-27	-05	-10	
3	- masc	-06	26	32	05	25	30	16	-05	17	02	08	18	25	16	-71**		
4	- fem	06	-32	-30	-02	-47**	-50**	09	10	07	00	-17	-21	-28	-34			
5	HPD score	05	30	45*	20	27	39*	01	20	02	-29	27	16	56**				
6	- masc	-44*	24	12	00	02	36†	01	26	05	-38†	25	02					
7	- fem	15	53**	37†	-21	39*	20	14	16	10	00	-11						
8	ITSC score	21	28	43*	21	56**	72**	-01	03	00	-81**							
9	- name	02	-20	-25	-02	-26	-47*	-14	-06	-09								
10	Rdg. interest -masc	02	38	37	-08	22	-05	53**	-07									
11	- feminine	00	00	04	07	-06	-13	49*										
12	- total	05	12	13	-03	04	-18											
13	Stanford - word	22	54**	59**	-06	68**												
14	- paragraph	33	72**	80**	07													
15	- vocabulary	-06	-26	04														
16	- spelling	35	79**															
17	- word study	15																

[a]decimals removed for ease of reading (for 50, read r = 0.50)

** p < .01

* p < .05

† p < .10

For this group there was a similar relationship between total reading interest score and each of masculine and feminine reading interest scores ($r = 0.53$ and 0.49, respectively).

No achievement data were collected for subjects in the Richmond control group (Tables 13 and 14) so no associations between sex-typing measures and achievement scores could be studied for this group. Sex-role preference was associated with drawing same-sex figure first ($r = 0.50$, $p < .05$) and number of feminine characteristics in figure drawings ($r = 0.43$, $p < .10$) for boys. Number of masculine games played by boys in this group was positively correlated with reading interest score ($r = 0.72$, $p < .01$), masculine interest ($r = 0.58$, $p < .05$), and sociometric rating ($r = 0.53$, $p < .05$). For girls in this group there were several significant correlations between sex-typing measures and impulsivity, measured by the number of seconds taken to draw a straight line "as slowly as you can" between two points five inches apart. The general pattern was that resistance to impulsivity (greater number of seconds) was positively associated with feminine sex-typing and negatively associated with masculine sex-typing.

A concise summary of results from phase one of the study is difficult to draw because of the great number of variables and the complex relationships. Boys in the segregated class seemed to clearly do less well in the achievement measures. All students at Richmond School, including control group children, associated school with male sex-typing. For boys in the experimental program, lower achievement was associated with perceiving school objects as being masculine. In general, there was little relationship between sex-role preference and school achievement but the particular patterns of correlations reported above should be studied before making particular applications.

Table 13

Intercorrelations Among Sex-Typing, Sociometric, and School Variables

for Richmond Boys in Year Four Control Group

(n = 16)

		Correlation with Variable[a]																					
	Variable	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
1	age	02	27	22	52*	-16	13	-06	-26	03	01	08	-11	50*	11	-21	20	-45*	-38	-33	28	09	06	18
2	socio A	21	11	27	29	11	-12	-05	-10	25	-12	08	13	02	18	-01	55*	-17	-26	45*	-38	39	14	
3	socio B	-28	20	63**	29	69**	-19	42†	06	53*	52*	-37	59*	-20	-02	-09	31	09	02	-19	31	-15		
4	Kagan - trials	-10	24	00	-01	-32	07	43†	-15	23	-19	32	-23	34	33	03	-31	-49†	-43†	37	-58*			
5	- masc	00	04	02	07	04	10	-10	09	-13	27	-19	48†	09	-09	-25	18	10	16	-86**				
6	- fem	-04	12	01	-03	-04	-23	01	07	16	-22	05	-32	-21	10	20	-05	-01	-14					
7	BFD -SS man	-26	-14	-26	-39	05	03	-37	09	-38	31	-41	31	-32	-61*	12	10	86**						
8	-SS woman	-32	-16	03	-30	29	-02	-18	05	-18	17	-22	22	-75**	-65**	45†	-02							
9	-masc	32	29	03	20	14	12	-36	-23	-23	24	-39	39	15	-06	-32								
10	-fem	-46†	-08	23	-09	24	-19	13	07	24	-28	43†	-44†	-63**	-10									
11	-first figure	-02	-21	17	36	-05	-35	06	46†	47†	-45†	51*	-25	39										
12	-ratio SS	24	14	-38	10	-56*	07	-21	01	-17	03	-05	-05											
13	-ratio size	25	15	28	23	24	-14	-08	14	07	41	-50*												
14	ITSC total	05	-26	14	11	-14	-06	03	12	30	-83**													
15	-name	-28	12	-02	-19	30	11	29	-16	-08														
16	Games -masc	-20	-20	72**	43	58*	-66**	34	52*															
17	-prop masc	-14	-28	10	20	09	-83**	-36																
18	-fem	-40	-02	32	-15	36	33																	
19	-prop fem	09	12	-34	-41	-24																		
20	Rdg. interest -masc	-13	-09	72**	27																			
21	-fem	20	20	74**																				
22	-total	-07	02																					
23	creativity	08																						

[a]decimals removed for ease of reading (for 50, read r = 0.50)

** p < .01

* p < .05

† p < .10

Table 14

Intercorrelations Among Sex-Typing, Sociometric, and School Variables

for Richmond Girls in Year Four Control Group

(n = 15)

	Variable	Correlation with Variable[a]																					
		24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
1	age	-38	-04	-31	12	-18	16	05	06	12	09	-07	26	11	0	-20	-27	20	-23	-43	34	-15	46†	46†
2	socio A	-14	-14	07	13	29	01	05	29	21	-17	08	-20	13	0	-39	-21	-14	-22	-38	18	-27	57*	
3	socio B	13	-17	06	13	-07	06	15	27	-08	00	-27	-32	14	0	01	-33	-33	-37	00	-14	-06		
4	Kagan - trials	12	-26	56*	38	49†	-16	24	29	04	18	-23	-25	-19	0	21	-38	-46†	-39	38	-11			
5	- masc	-57*	-27	-36	-26	-15	-05	-44†	-07	-12	-20	-12	59*	02	0	-26	-43	32	33	-57*				
6	- fem	82**	39	30	10	-02	08	37	05	-06	14	20	-19	-01	0	68**	51†	06	07					
7	HFD - SS man	13	11	-54*	-76**	-54*	-28	02	-21	-07	-18	32	35	-10	0	28	31	93**						
8	- SS woman	18	18	-51†	-71*	-47†	04	-07	-41	-17	-28	47†	27	26	0	16	43							
9	- masc	50	62*	-12	-15	-18	38	02	-42	-03	12	48†	-02	29	0	39								
10	- fem	60*	26	20	00	-12	-09	-04	-14	-40	15	-05	-04	-25	0									
11	- first figure	0	0	0	0	0	0	0	0	0	0	0	0	0										
12	- ratio SS	13	15	01	04	10	86**	-28	-61*	-38	-22	38	-20											
13	- ratio size	-29	13	-57*	-24	-50†	00	-03	-22	22	-12	-08												
14	ITSC total	30	34	13	06	08	35	08	-28	-09	-49†													
15	- name	-13	19	-25	-20	-09	-28	10	22	17														
16	Games - masc	-20	-09	-31	-19	-12	-40	73**	49†															
17	- prop masc	-01	-16	13	12	10	-68**	45†																
18	- fem	33	03	-15	-12	-18	-38																	
19	- prop fem	15	28	37	34	14																		
20	Rdg. interest -masc	09	02	84**	67**																			
21	- fem	20	12	79**																				
22	- total	35	-01																					
23	creativity	50†																						

[a] decimals removed for ease of reading (for 50, read r = 0.50)

** p < .01

* p < .05

† p < .10

Phase Two

The second phase provided for a modified grade one program and a male teacher. As described above, the modifications were directed at matching curriculum content and approach to student interests, providing for active involvement, and using real-life situations and activities.

As indicated in Table 15, ages of boys and girls were equivalent; ages for boys and girls in the other groups (Table 3) were essentially the same ($F(4,202) = 0.38$, $p = 0.82$).

General ability, as indicated by the standard score on Human Figure Drawings, was also similar for boys and girls. Compared to the HFD scores of other groups (Table 3), scores of students in the Modified Group were low. Girls included somewhat fewer masculine characteristics in their drawings than did boys. Compared to all other groups (Table 3), Margaret Jenkins students showed significantly more masculine characteristics ($F(4,202) = 7.04$, $p < .001$). Girls included more feminine characteristics than did boys ($F(1,202) = 44.56$, $p < .001$).

As expected, girls showed different sex-role preference than did boys, not only in the Modified Group but across the two experimental and the three control groups ($F(1,202) = 71.93$, $p < .001$). There was also a significant difference in ITSC score among students in the programs ($F(4,202) = 6.94$, $p < .001$) with boys in the Modified Program showing the most "masculine" preference and girls in the Margaret Jenkins control group showing the most "feminine" preference ($M = 26.36$, $S = 30.02$).

The boys in the Modified program classified somewhat more school objects as masculine than did the girls (Table 15) and somewhat fewer objects as feminine. Classifications by students in this program were

Table 15

Sex-Typing, Reading Interest, and Age for Boys and Girls

in Modified Grade One Program

Group	n	Stat[a]	age (mos.)	Kagan Classification			Human Figure Drawing				ITSC	Reading Interest		
				trials	School Objects		score man	score woman	masc	fem	score	masc	fem	total
					masc	fem								
Boys	12	M	83.42	43.92	5.17	2.75	97.92	97.00	1.17	1.50	78.00	7.83	7.58	29.58
		S	2.84	34.12	2.34	2.20	13.59	11.18	1.28	1.76	8.52	1.28	1.38	4.29
Girls	10	M	82.80	52.40	4.60	3.00	101.60	96.60	0.90	2.70	49.90	4.50	7.60	24.50
		S	3.84	36.02	1.69	1.95	9.69	13.52	1.14	1.42	38.68	2.29	1.80	5.64
Total	32	M	83.14	47.77	4.91	2.86	99.59	96.82	1.05	2.05	65.23	6.32	7.59	27.27
		S	3.35	35.25	2.09	2.10	12.11	12.30	1.22	1.72	30.25	2.46	1.59	5.56

[a]statistic: M = mean score

S = standard deviation

similar to those of students in other programs (Table 3).

Boys in the Modified program showed greater reading interest in masculine titles than did boys in the Segregated program (Table 3). They also surpassed the Year 4 control group in this regard. Interestingly, they also showed greater scores for feminine titles than did boys in other groups (Table 3) despite having similar total scores in Reading Interest.

Since much of the modified classroom program provided for discussion of topics of particular interest to the students, it was expected that their oral language development would be facilitated. Comparisons of scores for boys and girls with those of Year 1 controls (Table 16) suggest that scores are essentially the same.

There was no consistent tendency for boys in the modified program to classify school objects as masculine (Table 17) compared to boys in other programs. Greater proportions of modified boys categorized the blackboard and the teacher's desk as masculine as compared to other boys, but the pattern did not maintain for other school objects. Girls in the modified program had had higher proportions of masculine classifications than other girls for library, arithmetic, and pupil's desk. In general, there was only weak support for the conclusion that modified students had different sex-role perceptions of school objects.

For this group, comparisons were made of sex-typing indices from the Human Figure Drawings (Table 18). Both boys and girls in the Modified program were less likely to draw their own-sex figure first ($p < .05$) than control group children. Similarly, they showed a smaller ratio of standard scores, own-sex compared to opposite-sex, compared to boys and girls in the control groups. These two findings suggest that children in the modified program showed less sex-typing, at least in their figure drawings,

Table 16

Oral Language Scores of Modified and

Control Groups at Richmond School

Group	stat[a]	"Bullwinkle" communication units		"Tubby" communication units	
		number	mean length	number	mean length
Boys Modified	M	11.29	5.76	10.29	6.27
	S	8.75	1.62	6.73	1.96
Yr. 1 controls	M	11.00	5.64	10.50	6.56
	S	16.46	1.72	13.55	1.62
Girls Modified	M	7.12	5.37	9.94	5.56
	S	5.00	2.84	6.25	2.87
Yr. 1 controls	M	6.88	5.91	8.00	6.11
	S	4.58	2.27	5.91	2.40
Analysis of Variance					
Source: sex F (1,63)		3.01	0.92	0.45	1.05
program F (1,63)		0.01	1.07	0.18	0.89
sex X program F (1,63)		0.00	0.62	0.26	0.47

[a]statistic M = mean score

S = standard deviation

** $p < .01$

* $p < .05$

Table 17

Percentage Classifying School Objects as Masculine and Feminine

in Modified and Control Groups at Richmond School

Group		n	Classific.[a]	School Object								
				pencil	black board	library	book	arithmetic	school	desk	map	t.desk
Boys	Modified	12	m	71	57	43	57	57	36	50	79	57
			f	29	21	36	36	36	43	21	14	36
	Yr 4 controls	17	m	83	24	59	53	53	71	77	82	47
			f	18	59	41	24	35	18	18	6	47
Girls	Modified	10	m	53	27	67	40	67	53	67	53	20
			f	33	33	33	47	27	13	27	33	60
	Yr 4 controls	15	m	67	27	60	53	60	53	40	60	13
			f	27	40	33	33	27	20	33	20	40

[a] classification: m = masculine

f = feminine

Table 18

Human Figure Drawing (HFD) Scores of Modified and Control Groups at Richmond School

Group		stat[a]	first figure[b]	ratio of scores	ratio of sizes
Boys	Modified	M	0.65	0.89	0.95
		S	0.49	0.35	0.67
	Yr. 4 controls	M	0.76	1.01	0.93
		S	0.44	0.28	0.32
	Yr. 1 controls	M	0.88	0.98	1.01
		S	0.34	0.08	0.49
Girls	Modified	M	0.71	0.77	1.02
		S	0.47	0.39	0.67
	Yr. 4 controls	M	1.00	0.91	1.11
		S	0.00	0.05	0.38
	Yr. 1 controls	M	0.88	0.97	1.12
		S	0.33	0.11	0.19
Analysis of variance:					
	sex F (1,93)		1.60	2.39	1.39
	program F (2,93)		3.00*	3.38*	0.25
	sex X program F (2,93)		0.77	0.46	0.12

[a] statistic M = mean score

S = standard deviation

[b] 0 = other sex, 1 = own sex

** $p < .01$

* $p < .05$

than did other children.

Boys and girls in the Modified group also showed less reported participation in games that are typically sex-segregated (Table 19), compared in Year 4 control children. Boys showed a greater degree of liking the masculine games they had played, than did girls, and a lesser degree of liking the feminine games. This finding suggests that both boys and girls may try many activities regardless of the presence of a sex stereotype but their liking of the activity tends to correspond to the stereotype.

Sociometric scores for children in the Modified group varied markedly from those of children in the Year 4 control group (Table 20). Under conditions of limited choice, Modified group children tended to spread their nominations to a wider group than did the controls with the result that the average score for Modified-program children was lower. When no restrictions were placed on the number of choices that could be made, a different pattern emerged. Modified children tended to be chosen fewer times on average than did control group children, apparently because class members made fewer choices.

An indication of creativity was considered by scoring the fluency, or number of different responses, children made to problems which called for them to think of different uses of a newspaper, a knife, and a coat hanger. The comparison of scores reported in Table 20 supported the prediction that children in the Modified program would show greater creativity in problem-solving ($p < .01$).

Comparison of the number of seconds taken to draw a straight line between two points, considered to be a measure of resistance to impulsivity, showed that students in the modified program earned a lower score (Table 20). The results suggest that control group subjects show greater control over their physical activity, at least as measured by this task.

Table 19

Game Choices of Modified and Control Groups

at Richmond School

	Group	stat[a]	masculine games		feminine games	
			number played	proportion liked	number played	proportion liked
Boys	Modified	M	6.24	0.53	4.47	0.35
		S	2.91	0.21	2.48	0.15
	Yr. 4 controls	M	7.59	0.58	7.06	0.44
		S	1.58	0.41	1.92	0.16
Girls	Modified	M	2.41	0.22	4.00	0.47
		S	2.55	0.21	3.22	0.35
	Yr. 4 controls	M	4.00	0.32	7.33	0.68
		S	2.39	0.15	1.88	0.12
	Analysis of Variance					
Source:	sex F (1,62)		39.11**	39.93**	0.03	11.84**
	program F (1,62)		6.11**	2.70	23.83**	7.70**
	sex X program F (1,62)		0.04	0.23	0.38	1.31

[a]statistic M = mean score

S = standard deviation

** $p < .01$

* $p < .05$

Table 20

Creativity, Impulsivity, and Sociometric Scores

of Modified and Control Groups at Richmond School

Group		stat[a]	Sociometric-times chosen		Fluency	Impulsivity (seconds)
			bus (3 choices)	picnic (unlimited)		
Boys	Modified	M	3.65	5.18	44.47	19.71
		S	3.12	4.05	32.64	11.47
	Yr 4 controls	M	9.06	8.35	20.12	25.35
		S	3.75	3.76	7.82	11.25
Girls	Modified	M	2.53	3.94	36.65	16.65
		S	2.70	3.33	30.83	10.50
	Yr 4 controls	M	7.47	6.27	19.27	30.93
		S	4.81	4.33	7.39	22.51
Analysis of Variance						
Source:	sex (1,62)		2.26	2.98	0.59	0.10
	program (1,62)		33.41**	8.41**	13.22**	7.59**
	sex X program (1,62)		0.07	0.20	0.36	1.46

[a]statistic M = mean score

S = standard deviation

** $p < .01$

* $p < .05$

Further to the comparison of mean scores on the Reading Interest scale, mentioned above, responses of boys and girls were compared in terms of percentage of "like to read" scores for eight areas represented by the 40 titles. A greater percentage of boys in the Modified group than boys in other groups were interested in Make-believe and Humorous Situations; a smaller percentage were interested in Adventure and Anxiety Situations (Table 21). Among the girls' groups, a smaller percentage of those in the Modified group showed interest in Make-believe, Humorous Situations, Anxiety Situations, and Adventure. In general, girls in both experimental groups showed less interest in each of the reading areas than did the girls in other groups or the boys in both experimental and control groups.

Patterns of correlations between sex-typing variables and achievement, creativity, and interest variables are reported in Tables 22 and 23. For boys, number of school objects classified as masculine was positively correlated with fluency score ($r = 0.63$, $p < .05$) and masculine reading interests ($r = 0.73$, $p < .05$). Number of objects classified as feminine was negatively related to masculine reading interests ($r = -0.58$, $p < .05$; Table 22). A similar relationship between masculine classification of school objects and number of masculine reading interests was found for girls ($r = 0.70$, $p < .05$; Table 23). Classification of school objects was not related to reading achievement or mechanical causality (Piagetian level of explaining how bicycles and eggbeaters work) for either boys or girls.

Sex-role preference (ITSC) was positively related to reading success ($r = 0.51$ for level of difficulty and $r = -0.78$ for reading errors) for boys. For girls, sex-role preference for maleness was positively associated with Neale reading score ($r = 0.63$, $p < .10$). This association is the opposite of that predicted by Sexton.

Table 21

Percentage of "Likes" on Areas of Reading Interest in Experimental and Control Groups

Group		n	area of reading interest							
			today's world	family activities	historical events	make-believe	humorous situations	adventure	anxiety situations	happy activities
Boys	modified	12	76.9	61.5	61.5	90.1	92.3	78.2	30.8	84.6
	segregated	31	60.1	46.6	80.8	86.1	80.5	82.7	62.0	62.5
	Richmond-yr 4	17	67.6	81.2	58.5	68.2	88.2	78.4	46.2	88.2
	MJ control	28	72.9	51.5	82.6	78.8	78.3	91.1	44.5	85.5
	Richmond-yr 1	12	80.7	71.1	85.7	85.7	78.8	87.5	59.4	81.3
Girls	modified	10	51.2	74.3	57.2	66.3	78.6	54.8	39.3	85.7
	segregated	32	52.8	73.9	56.2	69.8	78.9	60.7	52.2	80.4
	Richmond-yr 4	15	57.2	84.0	57.8	81.9	82.7	60.0	50.0	88.4
	MJ control	25	51.4	82.6	69.6	73.9	87.0	56.8	62.0	87.0
	Richmond-yr 1	17	68.0	84.9	68.4	79.9	95.5	70.4	79.2	94.4

Table 22

Intercorrelations Among Achievement, Sex-Typing and

School Classification Variables for Boys in Modified Program

(n = 12)

	Variable	Correlation with Variable[a] 22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
1	Mech. causality	17	-41	54*	42	-35	25	-16	-23	-02	-64*	05	06	15	46	63*	12	-05	08	-37	29	21
2	Kagan -no. trials	25	-10	-04	28	-32	-30	-01	-08	-13	-18	-01	-32	15	-11	-06	20	-26	-15	-25	03	
3	-masc. school obj.	-18	-14	36	37	44	63*	34	-44	73*	-44	34	-35	-21	13	26	-51†	14	-02	-88**		
4	-fem. school obj.	-07	26	-40	-40	-28	-48	-26	46	-58*	46	-10	22	27	-08	-38	40	-29	-07			
5	HFD-stand score-m.	13	-40	12	-33	-32	01	-56*	-58†	-52†	03	-24	-30	50†	-19	12	27	73**				
6	-stand. score-f	40	-53*	34	05	08	13	-16	-18	-21	05	-31	05	-22	-51†	40	21					
7	-masc. char.	48	-24	-02	16	-46	-69*	-56*	23	-75**	-16	-36	03	13	-18	04						
8	-fem. char.	18	-58*	83**	56*	-17	26	-01	05	07	-12	04	33	-36	10							
9	-first figure	-55†	42	-09	06	-16	10	-28	-34	18	-43	42	17	31								
10	-ratio scores	-26	03	-23	-52†	-53†	-16	-61*	-60*	-51†	-02	02	-54*									
11	-ratio size	-03	29	-12	07	23	13	16	43	04	06	07										
12	ITSC - total	-78**	51†	-22	23	41	49	03	-29	38	-17											
13	-name	-17	02	-05	-51†	-08	-17	14	29	-16												
14	Rdg.interest-masc.	-32	30	08	28	56†	55	78**	06													
15	-feminine	40	01	07	27	-04	-39	49														
16	-total	06	16	05	16	39	34															
17	Fluency	-40	02	15	02	64*																
18	Impulsivity -Dec.	-30	34	-25	03																	
19	-June	31	-30	52*																		
20	Neale reading	37	-85*																			
21	-errors	-65*																				

[a] decimals removed for ease of reading

** $p < .01$

* $p < .05$

† $p < .10$

Table 23

Intercorrelations Among Achievement, Sex-Typing, and

School Classification Variables for Girls in Modified Program

(n = 10)

	Variable	Correlation with Variable[a]																				
		22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
1	Mech. causality	20	-34	34	34	13	-28	08	-37	29	-46	49	12	-75*	-56†	00	20	-48	39	-23	27	-18
2	Kagan -no. trials	-28	23	-24	23	19	-18	39	49	08	37	-36	19	55†	-11	51	21	44	-26	-61†	-10	
3	-masc. school obj.	00	10	23	16	11	51	47	18	70*	-29	33	09	-32	-42	12	-33	-25	17	-46		
4	-fem. school obj.	47	-41	22	-50	-69*	13	-34	-40	-16	11	-15	00	-11	26	-47	27	-22	-11			
5	HFD-stand score-m.	37	-41	38	-20	28	09	27	31	01	-39	36	62†	-45	42	32	04	26				
6	-stand. score-f.	-03	00	-15	-51	46	09	13	19	-16	22	-27	57†	74*	61†	70*	42					
7	-masc. char.	72*	-76*	65*	-71*	-07	-06	49	-16	28	-28	21	48	35	40	17						
8	-fem. char.	00	-02	-02	-13	45	-06	19	03	11	16	-18	64*	40	07							
9	-first figure	23	-17	06	-50	14	01	04	17	-44	-10	04	24	30								
10	-ratio scores	-29	30	-39	-36	23	09	-06	18	-14	47	-50	09									
11	-ratio size	51	-56†	42	-60†	02	35	49	04	38	02	-09										
12	ITSC - total	50	-47	63†	00	28	-30	31	-40	34	99**											
13	-name	-56†	54	-67*	09	-27	27	-36	41	-36												
14	Rdg.interest-masc.	48	-42	58†	-26	-19	44	69*	-10													
15	-feminine	-41	40	-24	22	05	40	42														
16	-total	49	-46	64*	-20	-02	30															
17	Fluency	01	03	07	-46	-11																
18	Impulsivity -Dec.	-36	21	-14	09																	
19	-June	-58†	58†	-43																		
20	Neale reading	90**	-91**																			
21	-errors	-95**																				

[a] decimals removed for ease of reading

** $p < .01$

* $p < .05$

Ratio of scores for male and female human figure drawings, own sex to opposite sex, was negatively related to reading interests for boys (Table 22) but not for girls (Table 23).

Correlations between sex-typing variables and language scores are reported in Tables 24 and 25. No consistent associations were found for girls' scores. Sex-role preference, as indicated by providing "It" with a masculine name, was related to complexity of language on three measures (Table 23). Classification of school objects as either masculine or feminine was unrelated to language for both boys' and girls' groups.

Conclusions

There was a general pattern of results which supported the conclusion that program modifications influenced perceptions and interests of boys and girls in the hypothesized direction but did not lead to the expected improvements in academic achievement.

Modifications in phase two of the program were associated with less sex-typing on the part of the children. In addition, there was somewhat more classification of school objects as being masculine by this group. One interpretation of this combination of results is that when children find recognition for both masculine and feminine interests and approaches in the classroom, they are not forced into the defensive stereotyping that results from incomplete representation of sex-roles. Furthermore, in this phase of the program sex-role preference for maleness was positively related to reading achievement, a reversal of the usual association reported in the literature (Austin, Clark, & Fitchett, 1971).

The pair of findings in the modified program regarding greater creativity (fluency) and greater impulsivity of both boys and girls raises some interesting

Table 24

Intercorrelations Among Language and Sex-Typing Variables

for Boys in Modified Program

(n = 12)

		Correlation with Variable[a]																
	Variable	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
1	Bullmoose - c.u.'s	19	24	-52*	33	52†	-05	-21	43	28	40	43	58*	55†	53†	-08	87*	20
2	-mean length	24	19	-49	14	19	08	-28	10	28	-06	60*	-02	53†	-02	28	-02	
3	Tubby - c.u.'s	19	13	-36	36	61*	23	-10	32	31	55†	33	78*	50†	71*	-07		
4	-mean length	57*	45	-43	-12	04	25	-29	11	13	11	41	13	30	-04			
5	Classroom - c.u.'s	-21	-35	-37	28	07	60*	-40	-20	47	48	32	91**	36				
6	-mean length	17	03	-52*	02	44	26	-40	30	38	07	75**	46					
7	Tractor - c.u.'s	07	-14	-34	10	29	63*	28	-11	52†	62*	27						
8	- mean length	24	04	-78**	32	28	10	-42	30	54†	13							
9	Beater - c.u.'s	42	-10	-33	31	40	10	-12	15	64*								
10	- mean length	09	-26	-67**	32	13	27	-33	25									
11	Kagan - masculine	34	36	-44	34	26	-51†	-88**										
12	- feminine	-43	-35	46	-10	-38	40											
13	HFD - masculine	-26	-20	-16	-36	04												
14	-feminine	53†	32	-12	04													
15	JTSC total	37	02	-17														
16	-name	-11	-12															
17	Games - masculine	64†																

[a] decimals removed for ease of reading

** $p < .01$

* $p < .05$

Table 25

Intercorrelations among Language and Sex-Typing Variables

for Girls in Modified Program

(n = 10)

	Variable	Correlation with Variable[a]																
		18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
1	Bullmoose - c.u.'s	-11	-07	-61	54	-04	87**	32	-31	72*	08	18	-02	-53	20	53	31	70*
2	-mean length	-40	19	-58†	55	-16	58†	46	-11	90**	-16	41	07	-31	16	42	77**	
3	Tubby - c.u.'s	-63*	-09	-04	04	-20	27	60†	-44	77**	-13	26	-09	03	-05	19		
4	-mean length	39	08	-34	33	-41	47	-01	-20	43	-01	26	41	-21	56†			
5	Classroom - c.u.'s	31	26	-63*	67*	-42	-12	-38	10	27	57†	57†	67*	-35				
6	-mean length	-10	31	37	-35	-57	-41	20	01	-12	42	47	37					
7	Tractor - c.u.'s	03	42	-42	45	-43	-04	-33	08	27	39	67*						
8	-mean length	-04	51	-59†	60†	-79**	-07	29	11	53	49							
9	Beater - c.u.'s	00	25	-25	26	-34	-12	-14	-01	10								
10	-mean length	-52	12	-53	49	-28	60†	50	-40									
11	Kagan - masculine	35	63*	-29	33	12	-33	-46										
12	-feminine	-27	-04	11	-15	-47	27											
13	HFD - masculine	-23	-06	-29	21	17												
14	-feminine	-31	-27	17	-18													
15	ITSC total	05	29	-99**														
16	-name	-04	-29															
17	Games - masculine	14																

[a]decimals removed for ease of reading

** p < .01

* p < .05

† p < .10

issues about costs and benefits of program innovations. This pattern seems to arise naturally from the characteristics of the program which emphasized action and practical problem-solving but the implications arising from heightened impulsivity deserve careful consideration and evaluation. Perhaps, under a longer period of observation, it would be apparent that this impulsivity is transitory and is reduced once students become involved in projects that interest them.

On the basis of the general pattern of results from this study, little support can be given to the alternative of segregating the sexes to meet the particular needs of boys and girls. On balance, the modifications conducted in phase two of the study with a class of boys and girls seem sounder. Such modifications were carried out by a male teacher but seem appropriate for any teacher to consider.

The study also demonstrated the importance of assessing, in local situations, the applicability of conclusions drawn about boys and girls. While some of the sex differences reported elsewhere were replicated in this study, others were not. The differing patterns and scores for boys and girls, as well as the different relationships among variables found in the present study supported the need to consider the sex of student in evaluating the influence of program characteristics on students.

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Appendix A

Names and Addresses of Suppliers of Classroom Materials Used in Study

S-W	Sargent-Welch Scientific Company 900 West 7th Avenue Vancouver, B. C.
Vilas	Moyer Division Vilas Industries Limited 1385 McLean Drive Vancouver, B. C.
Gage	W. J. Gage Limited 1500 Birchmount Road Scarborough, Ontario
3M	3M Education Services P. O. Box 5757 London, Ontario
Bridan	Bridan Products P. O. Box 219, Station A Scarborough, Ontario
Kleeco	Kleeco Publishing Inc., 600 West Jackson Boulevard Chicago, Illinois 60606
Gladwin	Gladwin Industries Ltd., P. O. Box 80545 Chamblee, Georgia 30005
ESC	Educational Supply Co., 105 Brisbane Road Downsview, Ontario
DLM	Developmental Learning Materials 3505 North Ashland Avenue Chicago, Illinois 60657
CP	Creative Playthings Princeton, New Jersey 08540

ADDENDA TO "BOYS IN PRIMARY SCHOOL"

The following descriptions of variables shown in tables presenting inter-correlations should be added, as designated:

p. 62 variable 18 - "Stanford - arithmetic"

p. 64 variable 18 - "Stanford - arithmetic"

p. 65 variable 18 - "Stanford - arithmetic"

p. 66 variable 18 - "Stanford - arithmetic"

p. 68 variable 24 - "impulsivity"

p. 69 variable 24 - "impulsivity"

p. 81 variable 22 - "Neale - difficulty level"

p. 82 variable 22 - "Neale - difficulty level"

p. 84 variable 18 - "Games - feminine"

p. 85 variable 18 - "Games - feminine"